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THE ALPINE FLORA



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The
Alpine Flora

BY HENRY CORREVON
AND PHILIPPE ROBERT

TRANSLATED INTO ENGLISH AND ENLARGED,
UNDER THE AUTHOR'S SANCTION, BY E. W. CLAYFORTH

With 180 reproductions of studies in water-colour



EDITED BY ATAR, CORRATERIE, 12, GENEVA

SB 421. C 67

To Sir
FRANK CRISP, K. C. B.
the creator of Friar-Park

the author

H. CORREVON.



AUTHOR'S PREFACE

TO ENGLISH EDITION



LORSQUE M. Clayforth a offert de traduire en anglais ma *Flore Alpine*, j'ai longtemps hésité à donner mon autorisation, sachant combien il est difficile de rendre dans une langue étrangère certaines expressions, certaine liberté d'allure qui caractérisent mon style de Suisse romand. D'ailleurs, tous les Anglais savent au moins lire le français et c'est en Angleterre que j'ai toujours rencontré le plus de lecteurs pour tous les ouvrages que j'ai publiés auparavant.

Depuis que j'ai lu la traduction de M. Clayforth, si heureusement agrémentée de précieux renseignements, je me félicite d'autant plus d'avoir accepté la proposition qui m'était faite. Je tiens à constater ici — et j'en félicite mon traducteur — que le texte français a été rendu avec la plus grande précision possible et que les paragraphes qu'il a ajoutés sur la culture en Angleterre de certaines plantes délicates, sur des appréciations esthétiques et jardinières au sujet de l'importance de telle ou telle espèce, donnent à l'ensemble du travail une valeur que le public anglais saura justement apprécier. Je tiens, en le félicitant pour son travail, à le remercier d'avoir bien voulu être, auprès du public anglais que je tiens en haute estime, car il sait apprécier des ouvrages tels que celui-ci, mon fidèle et savant interprète.

H. CORREVON.



PREFACE

TO THE ENGLISH EDITION



AT the present time, when the number of books dealing with alpine gardening is increasing rapidly, some word of explanation may appear necessary, some excuse, as it were, for offering an additional one to the public. The translator himself thinks, it is true, that it is sufficient to mention the name of the author, M. H. Correvon, by universal consent the greatest living authority upon the subject. The original French edition, also, was received with the fullest approval by our Horticultural Press, and a hope expressed that an English translation would not be long delayed. It will be found, too, on examination that the scope of the work differs considerably from that of those hitherto published. The author has addressed himself to a wider range of readers—not merely, that is, to those who cultivate the mountain flora in gardens at home, but also to those who travel in Switzerland with eyes open to one of the greatest of that country's charms.

The two classes are inter-dependent. As the number of alpine gardeners increases, so do more and more tourists find an interest in gathering the blossoms or in collecting the roots of alpine flowers. All true lovers of their beauty, therefore, will be grateful for the pages, which M. Correvon has given to the acclimatisation of mountain plants; the whole ground is covered, from a

reasoned and thoughtful exposition of the difficulties and dangers, based upon a description of their environment and physiological characteristics, to practical instruction in the proper and safe method of procedure.

The spring and summer visitor will find an invaluable companion in the plates, executed after water-colours by M. Ph. Robert. But they are of wider appeal. The appreciative words of M. Eugène Burnand, which form a preface to the original edition, are worth the quoting in this context. He writes :—

“You have honoured me with a request for a few lines of introduction to *la Flore alpine* illustrated by M. Philippe Robert. Your proposal is at once an honour and an obligation. I cannot, in a word, neglect the opportunity given of paying tribute to a work of such remarkable beauty, so thoughtful and tender, to which the young artist has consecrated so much love and unstinted labour.

“As I look upon the complete series of M. Ph. Robert’s water-colours scattered upon my table, a name instinctively occurs to mind—the name of Fra Angelico. There is the same feeling of intimacy, the same scrupulous fidelity of rendering, the same absence of strained effect, the same meditative and sympathetic vision in the modest painter of ‘Ried d’en haut’ as that which is revealed in the monkish artist of Fiesole.

“This exquisite flora could not bloom but in seclusion. Success could not come but from silent and fervid contemplation, with the ever-present aid of direct communion with reality. All this Ried offers in abundance, Ried and Valais where Ph. Robert has spent months of concentrated toil.

“The result is that which always awaits the conscientious artist, who looks at nature through his own eyes and is content to tell that only which she has directly revealed. This is the birth of original work; and *la Flore alpine* of Ph. Robert is original in the absolute sense of the word.

“Here we do not see conventional flowers, tortured and deformed in the modern fashion, nor the splashy flowers of impressionists. Alas for these splashy flowers washed in with broad sweeps of a brush laden with water and pigment! Alas for the pretentious roses! for the blowsy chysanthemums on dull, half-toned backgrounds!

“We have just the flower, represented beyond question with art, and with art that is sensitive, conscious, reasoned, but natural, scientific in precision, whose standard is essential Truth, and which is unencumbered by any passing illusions, save those that are due to effects of light and shade or to the chance relations of tone-values opposed to real and changing backgrounds.

“In the same proportion is its artistic significance enhanced. This synthesis, which neither deforms nor exaggerates, which ever returns to the immanent and ideal without sacrificing the true appearance of life, clothes an intellectual penetration that is authoritative and, as it were, final. It engraves itself upon the memory a thousand times better than the most faithful of coloured photographs, and thus acquires a genuine mission to instruct.

“But M. Robert aims still higher. He is seeking to justify by fact the profoundly pregnant theory which binds scientific truth close to aesthetic beauty — the beauty whose presentation is the goal of artistic effort.

“He himself has written, ‘I felt that it is not by violating the form of a plant that one succeeds in making it reveal all that it should tell from a decorative point of view. The further I advanced in the deep study of alpine flora, the more was I convinced that it is impossible to produce anything of beauty, to deliver any new message, except by getting as close as may be to Nature, in order to catch the silhouette of the plant in its most characteristic aspect’; and again later ‘I could well wish that this book might be a mine of precious documents for most artists engaged in landscape work, in mural painting, ceramics, embroidery and other industrial arts’.

“M. Robert has done better than his words : he has given a good example of self-revelation. He proves the immense importance in art of the individual sentiment of the creator.”

Of the arrangement of rockwork, that is, of the details of construction as opposed to the general plan, M. Correvon has written in another and smaller book, entitled *les Plantes alpines et de rocailles* ; and we English are, perhaps, wearied of such minutiae, when even commercial catalogues presume to teach by a scratchy sketch an art that cost Mr. Robinson pages to explain, and which can only be learned in a school of personal, often of bitter experience. Flat pockets for surface-rooters, open ones for those that increase by offsets, long, narrow ones for running stolonifers, etc., may be good general principles, but to be applied with intelligence, since many other factors are involved, e. g. the aspect and soil of the garden, the average rainfall and sunshine of the district. All depends upon a first-hand knowledge of place and plant, which alone can secure a harmony between the

needs of the one and the capability of the other. But a word may be in season as to the general planning. First, the result should look natural. This will not be secured by making a servile copy of any scene in nature, if for no other reason because one cannot then plant to a natural scale. The dwarfest Juniper would there out-ape a forest tree of nature, and *Thymus serpyllifolium* out-rival the mountain Rhododendron. By natural it is meant that the laws of geology, which govern stratification, etc., must be obeyed, nor may granites, schists and limestone be huddled in one chaotic mass. Arts must preside over it; three in chief, the geotechnic above mentioned, the horticultural, which will see that all is adapted for good growth, the aesthetic, which demands beauty. This brings one back again to scale; for, in beauty, proportion and harmony of line, unity of meaning in diversity of structure are greater than all effects of colour. Some there are even of alpine plants which are too stately or architectural in habit to be wisely admitted upon our mimic alp (for we may copy an upland pasture, though we may not build a tiny Jungfrau), where the little Junipers and Thymes will now be right in place; for just as the latter may not dwarf a mimic mountain, so may they not be crushed by the neighbourhood of *Gentiana lutea*. These majestic, herbaceous alpins must, alas, be something of pariahs, confined to the outskirts—Peris excluded from the Paradise.

All alpine gardens, whether in a single slope, or two facing slopes, or two ridges, or a hollow, are modifications, either by division or combination, of one or more valley forms. However simple in outline, monotony can be avoided by breaking the surface into tributary valleys

or rocky cirques. Shelter from the biting spring winds must at any cost be given; best by the lie of the land; next best, by an old wall, which may be inartistic but is honestly utilitarian, and does not injure the plants; worst, by heavy shrubs or trees, which are directly injurious. All slopes so protected should be open, airy and gradual, articulated here and there with bold masses of homogeneous stone; the stratification of each slope must be similar. A simple but almost ideal form would be a pair of ranges, one granite, one of chalk, each diversified with nooks and bays and crannies, the gentler, roomier slope facing the south-east. The upper end should be built up high, to guard off the north-east gales, and to retain the water feeding a stream in the underlying valley. Beneath the pond the valley should boldly fork and in each fork be built a moraine of either rock, with a hidden sluice connected with the reservoir above, to maintain in spring and summer a constant filmy overflow of water warmed by the sun and to deny the same in leaden days of autumn or of winter. Ambition would suggest a secret conduit along and under each watershed, breaking out where fancy moved into other regulative sluices, each controlling the humidity of its peculiar moraine. Does the reader enquire of this 'moraine'? It is the arcanum of our cult, and Mr. Farrer is the hierophant, in charming volumes are destined to become classics of garden literature.¹

These 'moraines' at once call to mind two cardinal points of good cultivation—one still only half-understood,

¹ On 'scale' and 'planning' readers will do well to consult an excellent paper in the *Journal of the Royal Horticultural Society*, Nov. 1910, by A Clutton Brock.

drainage—another almost invariably neglected, top-dressing. Many are too apt to fancy that the benefit of good drainage is summed up in the prevention of stagnant water about the roots. But drainage does far more ; in light soil, where it should especially be deep, it guards against drought as much as in retentive soil against sourness ; by giving free passage to the rain it opens aerating channels and carries warmth through the sub-soil ; it prevents a caking of the surface in fiery sunshine and by checking evaporation prevents an accumulation there of saline constituents and so secures an even distribution of inorganic manure throughout the whole feeding ground. And it is upon this slowly dissolving inorganic matter than an alpine chiefly lives. Not but what even in the highest zone there are extinct lake beds and such like places where alluvial soil has gathered to great depths ; there are half drained bogs, so that among our alpines are found plants happy in loam, or peat, or swamp. But the majority are growing in a shallow layer of soil hard upon the native rock. Some may be shallow rooters ; but even these draw most of their sustenance, not from the scanty organic substance around them or from such little portion of the direct rainfall which that layer can retain, but from the ever trickling film of moisture along the surface of the rock, a moisture that fell as rain upon the higher slopes and is now descending charged with soluble inorganic salts ; others bury their main roots far down in imperceptible, inconceivably narrow fissures, into whose depths little organic matter can penetrate. We could not imitate these fissures except by splitting some huge rock by chisel or wedge and fitting the two edges close together and

spreading a tiny mat of soil about the upper edge. Our narrowest pockets are by comparison chasms, as it were, choked with mingled grit and humus. Not that one even advocates the attempt to imitate them; to do so would be to forget the enormous waste of vegetable life upon the alps; for one plant that survives and thrives, how many never live or wither before they be well sprung up? But the fact that it is in such circumstances that alpine plants do best grow is eloquent of the need of a constant supply of soluble salts, well distributed, and this can be only secured by deep and perfect drainage. Again an alpine is ever receiving a top-dressing. There the process is natural. In our gardens it is, also, essential—it provides food for superficial roots, promotes the formation of layers, corrects the action of frost in lifting plants at the collar from the ground. For this we use compost; if of grit, it will keep the soil cool in summer and dry in winter, to save the leaves from damping off; sandstone will absorb the surface moisture—indeed the benefits are well nigh innumerable.

In conclusion the translator would emphasize the importance of growing alpine plants from seed; it is safe, cheap and interesting. If for no other reason M. Correvon's work ought to be welcomed because of those pages in which he lucidly exposes the folly of the amateur collector and teaches to the true lover of alpine flowers a better way.

Southampton, 1911.





Introduction



Of the different forms of vegetation which cover the earth, none is so popular, so much admired and praised as that of our Swiss mountains. The sky of the blue Mediterranean may have stamped that brilliance of aspect upon the flora of those shores with which we are familiar; southern Africa may bear her charming heaths, her startling pelargoniums and stately lilies; Australia may offer the wonders of her treasure house, and the ancient, mysterious East boast a wondrous vegetation of unmatched beauty; the orchids of the tropics may touch the superhuman or divine; yet there is no region in the whole world which can offer, in so confined an area as our little country, a richer or more charming flora, so manifold and pure in colour and in tone.

I have already described for the public this flora in several works, which have been quickly exhausted. Now I venture, in collaboration with a great artist, to display its beauties and its charms. I no longer regard it simply from a descriptive or scientific point, but, assuming the artistic nature of this volume, I am adopting a less severely botanical plan, and choose rather to deal with my subject more practically, as a branch of horticulture, writing of the acclima-

tisation of alpins and their place in gardens, and at the same time to pay due regard to the artistic and poetic side. Therefore, while following in the main the order adopted by scientific authorities, and working on the lines of the Index Generum of Th. Durand, the Index Kewensis and la Flore suisse of Gremli, regard for artistic arrangement has not always permitted me to adhere absolutely thereto. Lastly, the welcome which attended my modest volume of poetry Fleurs et Montagnes has encouraged me to find a place for the Muses in this world of flowers, which seems to be their favourite domain.

I have dealt much more fully than in the Atlas de la Flore Alpine or the Flore coloriée de poche with the results of pharmaceutical investigation into the remedial properties of mountain vegetables, especially with the applications of them popular among country folk. Here and there a corner is found for legends relating to flowers, or, as it is called in English, Flower Lore. To sum up, this work is not strictly and simply botanical in character, but a collection of things relating to the beauty and the charms of alpine flowers, their claims upon our interest, their poetry, as much as to their adaptation to culture and the ornamentation of gardens.

H. CORREVON.



COLOURED PLATES
AFTER WATER COLOURS OF PH. ROBERT



Fig. 1

Thalictrum aquilegifolium

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Fig. 3

Anemone sulfurea

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Fig. 2

Anemone alpina

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Fig. 5

Anemone narcissiflora

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Fig. 4

Anemone vernalis

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Fig. 7

Ranunculus pyrenæus

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Fig. 6

Ranunculus alpestris

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Fig. 9
Ranunculus aconitifolius
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Fig. 8
Ranunculus glacialis
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Fig. 10

Trollius europæus

Page 266



Fig. 11

Aquilegia alpina

Page 268



Fig. 12

Aconitum Napellus

Page 271



Fig. 13

Aconitum Lycoctonum

Page 271



Fig. 14
Papaver alpinum
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Fig. 15



Fig. 16

Draba (Petrocallis) pyrenaica
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Fig. 17

Erysimum ochroleucum
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Fig. 15

Draba aizoides
Page 276



Fig. 18

Dentaria pinnata

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Fig. 19
Arabis alpina
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Fig. 20
Arabis bellidifolia
Page 280



Fig. 21



Fig. 22

Fig. 21

Hutchinsia alpina

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Fig. 22

Thlaspi rotundifolium

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Fig. 23

Helianthemum vulgare

Page 282



Fig. 24

Helianthemum alpestre

Page 283



Fig. 25

Viola calcarata

Page 284



Fig. 28



Fig. 27

Viola heterophylla

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Fig. 26

Viola cenisia

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Fig. 28

Viola biflora

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Fig. 29



Fig. 30

Fig. 29

Polygala chamæbuxus

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Fig. 30

Polygala alpestris

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Fig. 32

Dianthus superbus

Page 291

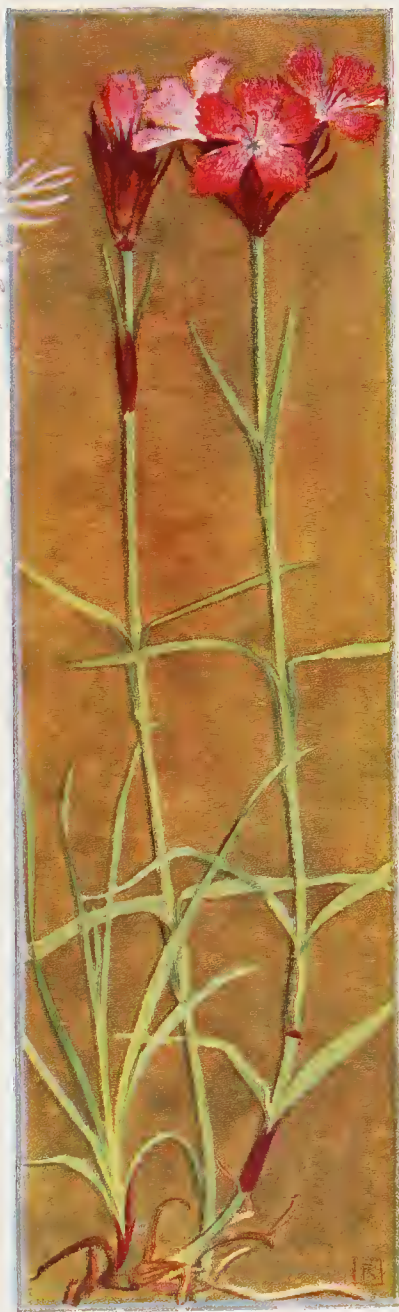


Fig. 31

Dianthus Carthusianorum

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Fig. 34



Fig. 33

Fig. 34

Saponaria ocymoides

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Fig. 33

Gypsophila repens

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Fig. 35



Fig. 36

Fig. 35
Silene acaulis
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Fig. 36
Silene rupestris
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Fig. 37

Lychnis sylvestris (*Melandrium diurnum*)

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Fig. 38
Lychnis viscaria
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Fig. 39
Lychnis Flos-Jovis
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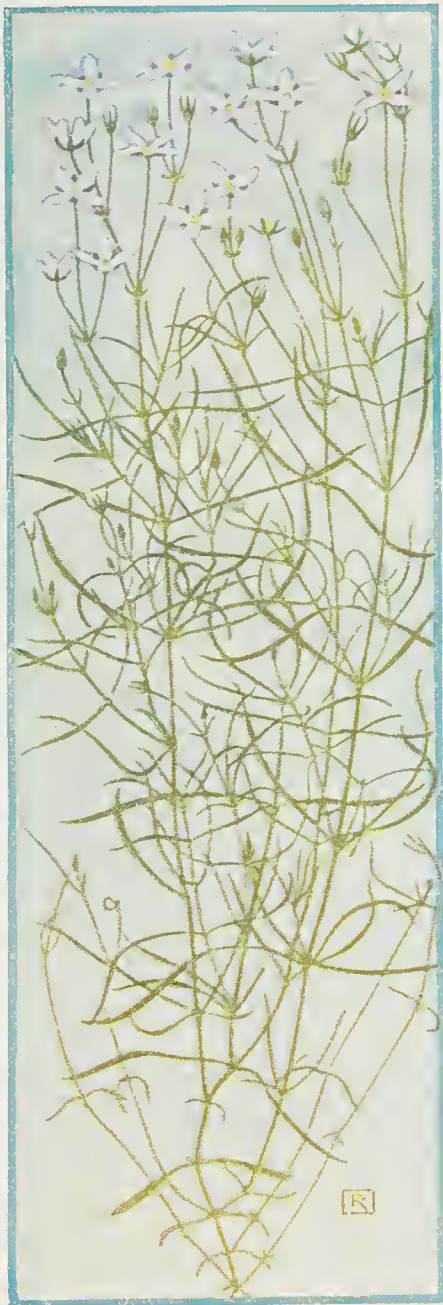


Fig. 40

Mœhringia muscosa
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Fig. 41

Cerastium arvense
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Fig. 42
Cerastium glaciale
Page 297



Fig. 43
Linum alpinum
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Fig. 44

Geranium rivulare (aconitifolium)

Page 299



Fig. 45

Geranium sylvaticum

Page 300



Fig. 46
Genista sagittalis
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Fig. 47
Genista tinctoria
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Fig. 48
Anthyllis alpestris
Page 303



Fig. 49
Trifolium alpinum
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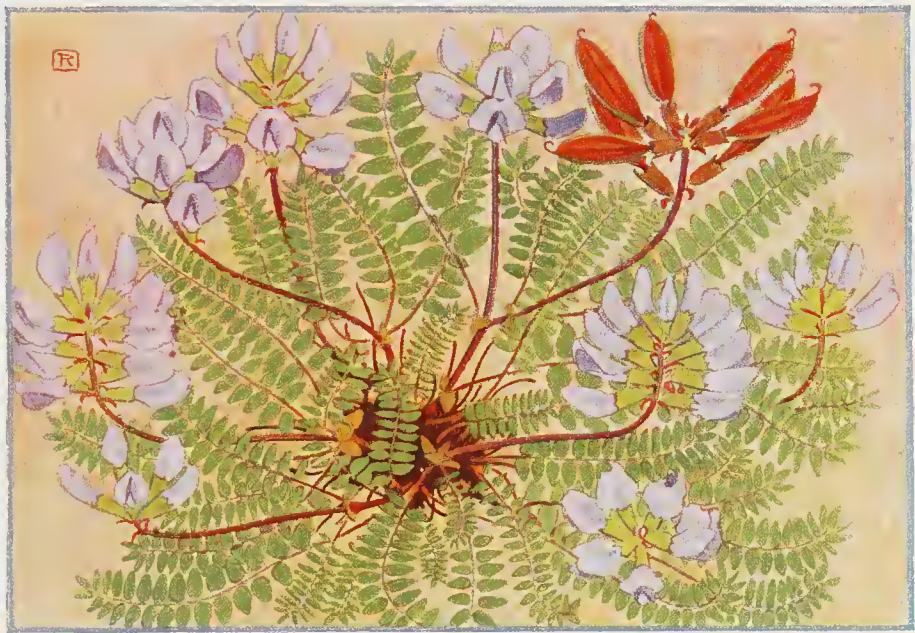


Fig. 50



Fig. 51

Fig. 50
Oxytropis montana
Page 304

Fig. 51
Oxytropis campestris
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Fig. 53



Fig. 52

Fig. 53

Hippocrepis comosa
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Fig. 52

Coronilla vaginalis
Page 306



Fig. 54

Hedysarum obscurum

Page 307



Fig. 55

Orobus luteus

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Fig. 56



Fig. 57

Fig. 56
Dryas octopetala
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Fig. 57
Geum reptans
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Fig. 58

Potentilla aurea

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Fig. 59

Potentilla grandiflora

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Fig. 60

Potentilla rupestris

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Fig. 61

Rosa alpina

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Fig. 62

Alchemilla alpina

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Fig. 63
Epilobium Dodonæi
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Fig. 64



Fig. 65

Fig. 65

Sempervivum montanum
Page 322

Sempervivum arachnoideum
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Fig. 66
Saxifraga cotyledon
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Fig. 67
Saxifraga aizoon
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Fig. 68
Saxifraga cuneifolia
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Fig. 70



Fig. 71



Fig. 69

Saxifraga stellaris
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Fig. 70

Saxifraga cæsia
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Fig. 72

Saxifraga bryoides
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Fig. 71

Saxifraga Androsacea
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Fig. 75



Fig. 73

Saxifraga aspera

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Fig. 74

Saxifraga aizoides

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Fig. 75

Saxifraga oppositifolia

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Fig. 76

Saxifraga rotundifolia

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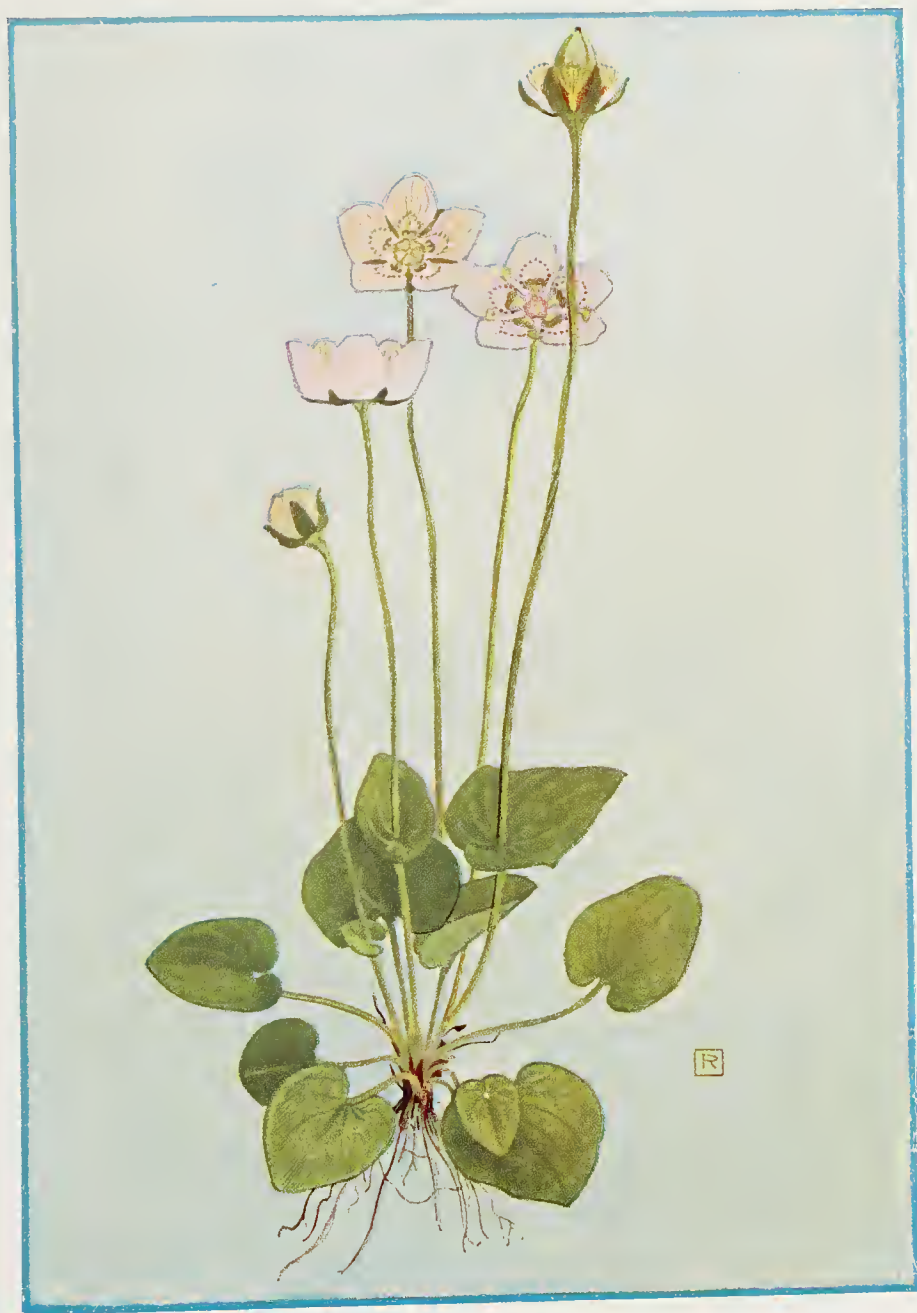


Fig. 77

Parnassia palustris

Page 334



Fig. 78

Eryngium alpinum

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Fig. 79
Bupleurum stellatum
Page 338



Fig. 80
Pimpinella magna rosea
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Fig. 81

Astrantia major

Page 338



Fig. 82

Valeriana montana

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Fig. 83

Valeriana tripteris

Page 341



Fig. 84
Adenostyles albifrons
Page 344



Fig. 85

Homogyne alpina
Page 345



Fig. 86

Aster alpinus
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Fig. 87

Bellidiastrum Michelii

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Fig. 88

Erigeron alpinus

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Fig. 89

Gnaphalium dioicum

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Fig. 90

Leontopodium alpinum

Page 349



Fig. 92
Artemisia glacialis
Page 351



Fig. 91
Artemisia mutellina
Page 351



Fig. 93

Leucanthemum alpinum
Page 353



Fig. 94

Aronicum scorpioides
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Fig. 95

Arnica montana

Page 355



Fig. 97
Senecio incanus
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Fig. 96
Senecio Doronicum
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Fig. 98
Carlina acaulis
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Fig. 99
Centaurea montana
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Fig. 100
Crepis aurea
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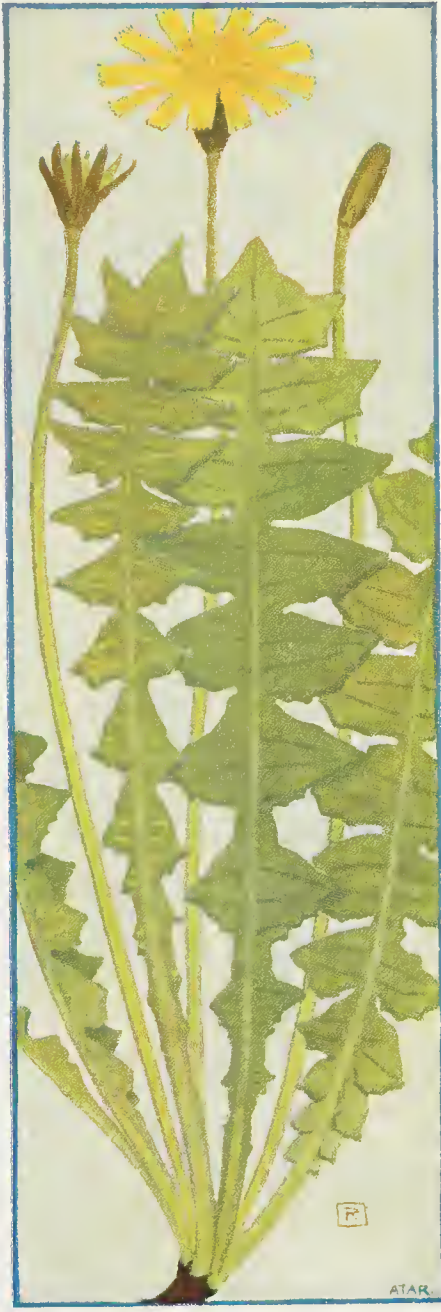


Fig. 101
Aposeris foetida
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Fig. 102
Mulgedium alpinum
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Fig. 103

Hieracium aurantiacum

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Fig. 104

Hieracium villosum

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Fig. 105

Phyteuma betonicæfolium

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Fig. 106

Phyteuma orbiculare

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Fig. 107
Phyteuma hemisphaericum
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Fig. 108
Phyteuma pauciflorum
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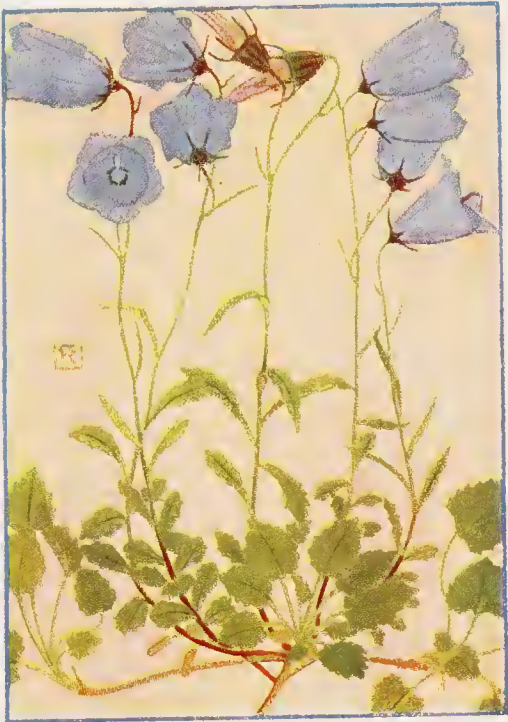


Fig. 109
Campanula pusilla
Page 366



Fig. 110

Campanula rhomboidalis

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Fig. 111

Campanula barbata

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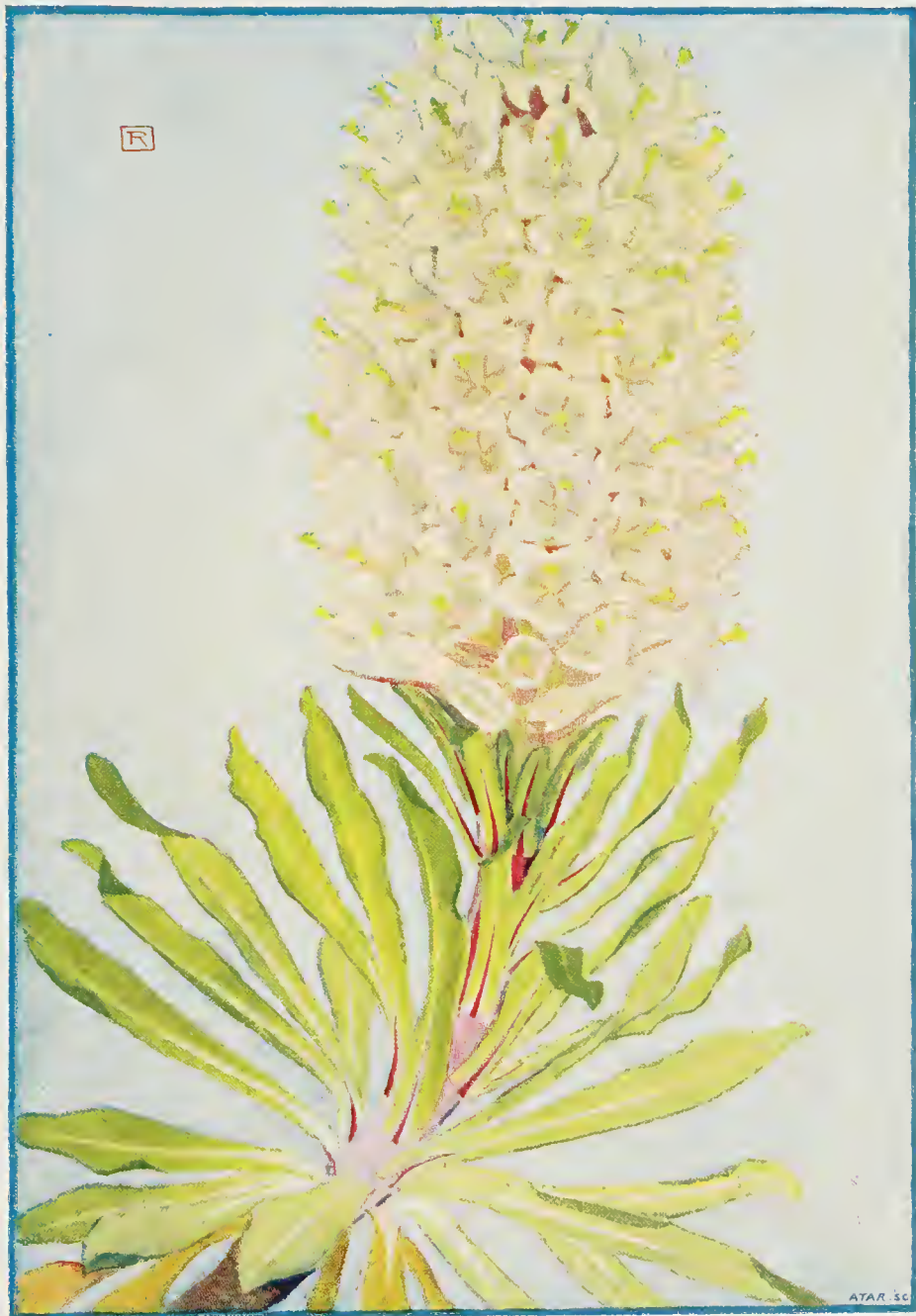


Fig. 112

Campanula thyrsoidea

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Fig. 113



Fig. 114

Fig. 113

Vaccinium Myrtillus
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Fig. 114

Vaccinium uliginosum
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Fig. 116



Fig. 115

Fig. 116

Arctostaphylos Uva Ursi
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Fig. 115

Vaccinium Vitis Idæa
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Fig. 117

Rhododendron ferrugineum

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Fig. 119
Pyrola rotundifolia
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Fig. 118
Pyrola uniflora
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Fig. 120
Pyrola secunda
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Fig. 121

Primula elatior

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Fig. 122

Primula officinalis

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Fig. 124

Fig. 123

Fig. 123
Primula Auricula
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Fig. 124
Primula minima
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Fig. 125
Primula hirsuta
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Fig. 126

Primula farinosa

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Fig. 127

Cortusa Matthioli

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Fig. 128



Fig. 130

Androsace villosa

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Fig. 129

Androsace carnea

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Androsace lactea

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Fig. 131

Soldanella alpina

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Fig. 132

Soldanella minima

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Fig. 133
Cyclamen europæum
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Fig. 134

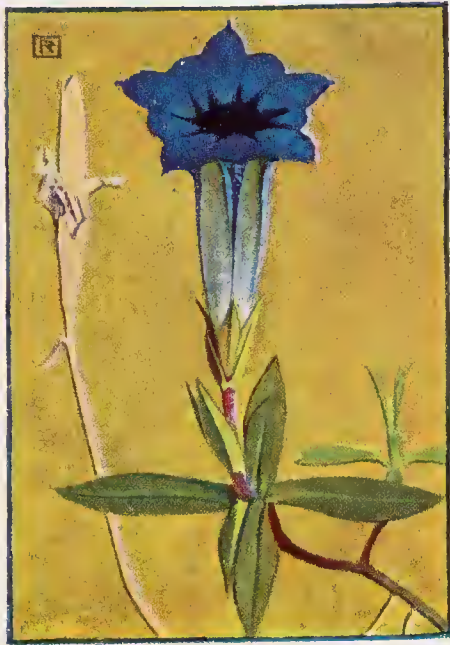


Fig. 135

Gentiana Kochiana
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Fig. 134 bis

Gentiana Clusii
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Fig. 134

Gentiana acaulis
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Fig. 136



Fig. 137



Fig. 139

Gentiana bavarica
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Fig. 136

Gentiana verna
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Fig. 138

Gentiana brachyphylla
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Fig. 137

Gentiana verna var. *chionodoxa*
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Fig. 140

Gentiana asclepiadea

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Fig. 141

Gentiana lutea

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Fig. 142

Gentiana purpurea

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Fig. 143

Gentiana ciliata

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Fig. 144

Gentiana germanica

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Fig. 145

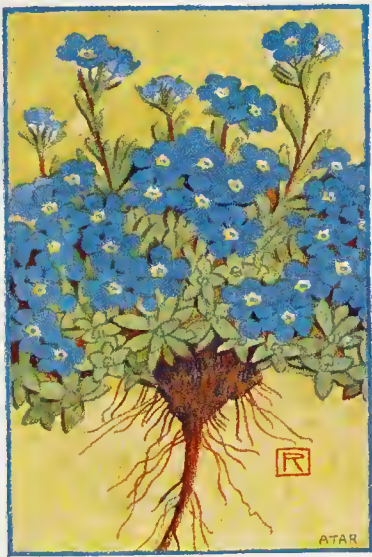


Fig. 146

Eritrichium nanum

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Fig. 147

Linaria alpina

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Fig. 145
Myosotis alpestris
Page 400



Fig. 148



Fig. 149

Veronica bellidioides
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Fig. 150

Veronica aphylla
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Fig. 148
Veronica saxatilis
Page 405



Fig. 151

Digitalis ambigua

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Fig. 152

Digitalis lutea

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Fig. 153

Erinus alpinus

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Fig. 154

Bartsia alpina

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Fig. 155

Pedicularis tuberosa

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Fig. 156

Pedicularis verticillata

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Fig. 158
Pinguicula alpina
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Fig. 157
Pinguicula vulgaris
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Fig. 159

Rumex scutatus

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Fig. 160

Polygonum bistorta

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Fig. 161



Fig. 162

Fig. 161
Daphne cneorum
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Fig. 162
Daphne alpina
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Fig. 163
Nigritella angustifolia
Page 417



Fig. 164
Orchis globosa
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Fig. 165
Gymnadenia albida
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Fig. 166

Lilium Martagon

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Fig. 168
Anthericum liliago
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Fig. 167
Paradisia Liliastrum
Page 419



Fig. 169
Veratrum album
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Fig. 170
Luzula nivea
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Fig. 171
Luzula lutea
Page 421



Fig. 172
Eriophorum Scheuchzeri
Page 422



Fig. 173
Eriophorum angustifolium
Page 422



Fig. 174
Botrychium lunaria
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Fig. 175
Cryptogramma crispera
Page 424



Fig. 176

Cystopteris fragilis

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Fig. 177

Blechnum spicant

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Fig. 178

Polypodium Robertianum

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GENERAL INTRODUCTION

THE FLORA OF THE MOUNTAINS

The Nature and Environment of Mountain Flora.

The Acclimatisation and Culture of Alpines.

Alpine Gardens and Rockeries.



GENERAL INTRODUCTION



The Flora of the Mountains



The Nature and Environment of Mountain Flora

MOUNTAIN vegetation, whether it clothe the slopes of the Alps, or the Jura, of the Pyrenees, of the Caucasus, or the Himalaya, is stamped with a common and distinctive type. There are certain characteristics peculiar to this flora which must at once strike even the most inobservant traveller — a shortened stem, a dwarf and restrained growth, with flowers, on the other hand, exaggerated in comparison and developed to stronger proportions than elsewhere.

The lowlands present large plants, the branches broad and spreading, the foliage fully displayed, the flowers, as a rule, smaller than the leaves. In highlands all is changed; the stem shrinks almost to non-existence, at least is always very small; the flowers are large and brilliant; the foliage is dwarf, inconspicuous and often hairy. At great heights this downy covering becomes peculiarly insistent, as though a woollen coat were needed to wrap the tiny cells against the colds of night. No doubt the leaves are often smooth, but still the battle against rime and frost is not forgotten; for their surface takes a

tougher texture, and girds a leathery armour round the tender tissues. In a word, the plants adapt themselves to external conditions; they furnish themselves with organs which enable them to resist alike cold and wind and excessive sun. In species, however, which thrive in shady or cool places, the corresponding organs are usually soft and delicate.

Many of the downy species may be met on dry slopes exposed to parching wind and powerful sun—Edelweiss, “The Star of the Glaciers”, *Senecios*, *Sempervivums*, *Artemisias*, etc. But one may also find many without hairs—the prostrate *Azalea*, *Rhododendron ferrugineum*, *Gentians*, incrusting *Saxifages* and others with hard, thick, glistening leaves, whose waxy coating checks any over-rapid evaporation. A search, again, in cool and shady places will disclose ferns, lycopods, mosses, viscous primroses and soft-leaved saxifrage.

The flowers, also, of our high alpine present a further contrast, eloquent of the sun’s increasing power. They riot in the open with dazzling pigments and flaunt ample petals against the light; but in the shadows or under a northward-facing rock—this is the rule—dwells an insignificant folk, etiolate and little-flowered.

The social life, again, of plants is obvious to everyone, the communities, that is, which members of the same species form among themselves. Conifers gather into forests; grasses spread over meadows; sedges people barren plains; the early spring *Crocus* and *Narcissus* rise together uncounted in dense and serried ranks. And not only so, but there are associations of species with species—unions to which the term “formations” has been given—colonies, that is, of diverse and often heterogeneous types, whose aggregate forms a harmony absolute in itself and also one in harmony with soil and climate. Modern botanists, particularly those of Germany, have

written at length on these formations, and despite the extravagancies to which some theorists have pushed the principle, in itself the theory is unquestionably true.

For example, the alpine Aster is found allied with Erigerons, Leontopods, *Saxifraga aizoon*, etc. ; *Viola cenisia* makes its home among chalky rocks alongside *Thlaspi rotundifolia*, *Ranunculus parnassifolius*, *Thalictrum saxatile*, *Kernera saxatilis*, *Adenostyles leucophylla*, etc. But why? Undoubtedly because these species find in one place the conditions necessary to their existence, not simply from a craving for the association. Some there are, however, which seem to obey a mutual attraction and so seek to unite in excluding from their territory strangers to the colony. For example, mark the *Rhododendron ferrugineum*, girdling our alps with a broad and solid belt, in arrogant lordship of the ground and soil where it grows. Yet into fellowship are admitted some few relatives and friends : diverse *Vaccinia*, *Gentiana purpurea*, *Gymnadenia albida* come within the circle and shelter in the owner's shade. So the dwarf juniper welcomes the common Heath (*Erica vulgaris*), *Lycopodium alpinum* and *clavatum*, *Campanula barbata* and *Scheuchzeri*, *Arnica montana*, *Hypochæris*, *Anemone alpina* and *sulfurea*. *Azalea procumbens* may often in selfish egoism spread acres-wide her broad horizontal sheets ; yet modest plants find shelter there, *Potentilla aurea*, *Phyteuma hemisphæricum*, *Empetrum nigrum*, etc. Not less assertive are some of the willows, *Salix herbacea*, *retusa*, *reticulata*, *serpyllifolia*. In self-contained colonies of straggling shrubs, whose flattened branches often rise but a few inches from the ground, they clothe wide stretches of high alp. Whole domains, again, are monopolised by swards of grasses or of sedges, associated, however, with plants which can do them useful service in repelling all that is hurtful or unprofitable. These are true colonies, zealously maintaining the

struggle for existence and toiling for the common good.

The higher the flora climbs the mountain, the more we see vegetation shrink, gathering its forces about the root and seeking to nestle against a soil that is warmer than the air. Gradually the annual species grow rarer, till at extreme heights they entirely disappear. The brief summer allotted to such plants does not permit them to accomplish in one season the cycle of existence. Here all are perennial except a few gentians and eye-brights. Everywhere one sees plants with permanent roots, breaking into branches right from the base and spreading their offsets close to the ground. Genera, which in our plains are familiar as shrubs or even as grand majestic trees, are represented now by dwarf and creeping species, which crouch and closely hug the soil. Between the rocks, in every crack and fissure nestle close-shaven plants, dense pincushions, as it were, or hemispheres compact of an infinity of clustering rosettes, and covered with such a profusion of sessile flowers, sitting as tight as embroidery upon the surface of the plant, that one often hardly notices the foliage through this veil, which is at times one of dazzling brightness. The leaves, when found, are small, very small, persistent, and imbricated or overlapping one another like tiles.

These are the jewels of the alpine flora—these tiny, crowded balls—marvels everyone, of which the eye is never wearied. They gleam upon the high passes and rocky ridges like so many pure stars, radiant in glory and in beauty, pictures which no painter, however great an artist, can paint nor any writer tell of in their splendour. The climber's most laborious efforts to win to their contemplation are well repaid by a sight which recalls that ancient Latin phrase "*terrestria sidera, flores*", or the more profound proverb of the Chinese "*Stars are the flowers of heaven*".

In mountain vegetation all the energy of the plant is concentrated on the flower and, consequently, on the reproductive organs. A rough knowledge of the external conditions under which alpins exist is sufficient to show that these plants must by nature be true perennials, and tenacious of life.

There is a wide difference between the climate and the meteorological conditions which obtain in the high alps and those to which we are accustomed in the lowlands. With us a slow and insensible passage from a moist winter, comparatively mild and brief, to a dry and burning summer encourages a slow and gradual development of leaf and stem. Above the snow-line the winter is very long, of nine months or it may be even of years (for there are deep glens which a rainy summer never frees from snow). Suddenly, in a moment, there succeeds a summer brief but most favourable to vegetation. Light, heat and moisture are lavished on the plant; instantaneously, the long sleep shaken off, it enters, without passing through a spring, into the full bounty of the summer days. At the breath of the föhn the snow vanishes; in a few days, in a few hours the dingy hue of the carpet changes and robes itself in emerald. In the twinkling of an eye, at a magic touch, the world awakes and lives and grows and blooms. On every hand burst brilliant flowers, and busy around them fly insect fertilisers, the powerful allies, without whom many plants were doomed to barrenness. Some ardent spirits, in their impatience to unfold, cannot await the final melting; the stems, thanks to a dark colour, push through the covering, and at times the flowers bloom upon a bed of white. Most frequently may this be noticed in Soldanellas, Crocuses and *Petasites albus*.

This impatient desire to live is explained by the long, slow preparation to which the plant submits during her period of rest—of relative rest—under the covering of

snow. For in winter the plant is living and making ready for the rapid normal development. It is feeding roots, swelling buds, and setting all in order for the great evolution. The sun appears; every root—and an alpine's roots are countless—is quickened to activity, to toil in the first instance for bud and flower alone, then for the leaves. With the earliest species the flowers outrun the foliage or respiratory organs, whose growth is postponed as last year's leaves are sufficient for immediate needs. The long winter torpor over, a time we have seen of but comparative rest, all this concentrated energy is prodigally outpoured. With days of continual light, clear and intense, fourteen or even sixteen hours long—with a sun of power unknown below—with abundant water of stream or vapour—light, heat and moisture, all in amplest measure—with myriads of unwearied roots and radicles—there is no lack of activity here. Now let us look at the fetter, that is to say the causes that dwarf the plant and tie it flat and close to the ground.

First there is the familiar fact that night is the time for growth and expansion of tissue. By day growth is inversely proportionate to exposure to the sun. It clearly follows, therefore, that, the alpine nights being frost-bound, nocturnal growth is impossible and that only in the brief summer twilight, when the sun-rays have lost their power, can any development be made. Hence the internodes are extremely short and the general character of the stems and branches is much stunted. Just as by day, the excessive heat and strength of the sun stimulates the enlargement and vivid coloration of the petals, so it forbids a rapid extension of stalk and leaf. No time of growth is granted to these organs except the space between twilight and the chilling of the air. It is true that the loss is made up during the latter part of autumn, when the plant takes advantage of a moment of grace to repair her respiratory

light
intensity

organs and put out her new shoots during the cloudy and genial days which usher in the winter.

A second cause are the violent winds that shatter any stalk which ventures to lift itself even a little above the ground. Lastly, radiation during the icy nights compels the plants to seek shelter near the soil; for the ground preserves more warmth than the air, and also stores the moisture which is needed against a time of drought. The mother earth is her child's natural protector.

The composition of mountain soil differs greatly from that of the lowlands. In chinks of rocks, at the foot of broken cliffs, on weatherbeaten ridges is found a black, porous humus as rich in nutritive matter as it is poor in organic constituents. Centuries may pass before the minute accretions form a kindly bed where plants can thrive. First come the Lichen-folk, those earliest colonisers of the rocks, establishing themselves here and there in barren places where permanent moisture is secured. The Mosses follow, richer in tissue and more exacting than the frugal Lichen. The Mosses decompose, and on their ruins more developed types are sown, only to pass away in their turn and to furnish soil for the higher types of vegetable life.

Thus vegetation advances and is installed over all the hills, thanks to the Lichens, which, as the precursors and promoters of vegetable life, play an important part in the economy of nature.

I have mentioned that this rock-soil is dark, spongy, always cool and humid. Mixed with it in varying quantity are pebbles and sand. The physical composition, then, is such as to promote growth. Considered chemically, soil is of different kinds; it contains the detritus either of calcareous or of granitic rocks, and in composition generally corresponds to the nature of the rock that is dominant in the neighbourhood. In calcareous districts

it is rich in lime, and the plants upon it are lovers of chalk. Among granitic mountains silica predominates, and the flora consists, in degrees more or less marked, of the species which reject the chalk and choose the silica. In dolomitic countries, where the chalk is impregnated with magnesia, a corresponding vegetation is found, and the parallel may be extended indefinitely.

Alpine flora, then, is divided, according to its chemical affinities, into two great groups, the chalk-lovers and the silica-lovers; other types fall under one or other of these categories. Chalk appears to have so far the greatest influence on the distribution of plant-life, that its presence or absence seems to be the determining cause of the presence or absence of any particular species. Not that the influence of silica is not almost as important¹. Later we shall see how *Gentiana acaulis* has taken on modifications of the typical form, in adapting itself to the chemical composition of the soil where it is growing. And the same holds good of a fairly large number of species, especially in our alpine flora. For this reason, in order to make a comprehensive observation and study of the whole range of alpine vegetation, two alpine gardens have been established in Switzerland, one, *la Linnæa*, on siliceous soil, the other, *la Rambertia*, on chalk. Growth in the two gardens is very different; indeed it cannot but differ; and it is most interesting to watch the behaviour under cultivation of chalk-loving species at Linnæa and of chalk-rejecting ones on the Rochers de Naye.



¹ Consult Dr. Magnin's great work, *La Végétation de la région lyonnaise*.

The Acclimatisation and Culture of Alpines

Such are the conditions necessary to the life and growth of our mountain flora—intense and unbroken sunshine, complete exposure, burning heat, the effects of which are lessened by cold nights and unfailing moisture permeating earth and air alike—all lavished with instantaneous generosity after the long winter rest described is over. One can understand, therefore, that plants accustomed to such a climate find it hard to endure the far different conditions which our lowland gardens at the best can offer. A drier air, winters that are no winters for them, a feebler light with which we are content, our deadly summer, and a long spring of transition to and preparation for the sunlit days are all causes which modify, in this new environment, nature and organs alike.

So true is this, that for many years mountain vegetation was reputed to be impossible of acclimatisation. Of course the idea was wrong; to-day almost every alpine species has been brought into cultivation, both in Switzerland and in England, where horticulture has reached an excellence unimagined elsewhere. In France, Austria, Germany—over the whole temperate zone, the culture of alpines has won a popularity that grows from day to day, and there is scarcely a country outside the tropics into which the flora of the snow-line has not been introduced. The alpine garden of acclimatisation, founded in 1884 at Geneva, has spread the fashion through the five continents and the horticultural house of *Floraire* is now sending established plants and seeds over all the world.

From the sixteenth century onwards English botanists and gardeners introduced across the Channel *Gentiana*

lutea and *acaulis*, varieties of *Primula auricula*¹, together with several other alpine species. But it was not until the second half of the last century that these cultures won their proper place as enfranchised members of the horticultural world, and that business houses were opened which specialised in the acclimatisation and sale of alpine plants. In England such firms are numerous and successful. Holland and Germany can show two or three; in Switzerland the house of Frœbel at Zurich and the Floraire garden of acclimatisation at Chêne-Bourg near Geneva have now for many years had a world-wide clientele². More and more, in proportion to the growing passion for mountaineering, the number increases of those who cultivate the children of the mountains in the rockeries or borders of their gardens, and a literature, which has arisen on these plants and their culture, forms no inconsiderable part of our horticultural and botanical bibliography.

The gardens in which none of these mountain people find a home are the exception. Artificial rockeries have been built since the eighteenth century in England for their reception; on the continent the honour of being the first to introduce them into cultivation is due beyond all doubt to an illustrious native of Geneva, a fellow-townsmen of mine, our famous botanist Edmond Boissier. I do not deny that before his time Necker de Saussure tried towards the close of the eighteenth century to establish alpine plants in the botanical garden then situated at Calabrie³; but he met with only indifferent success. De Candolle, when founding the botanic garden of the Bastions, reserved a shady border for the alpine specimens

¹ Paxton's Botanical Dictionary.

² The catalogues of plants and seeds offered by our garden at Floraire will be forwarded free of cost on application.

³ Bulletin no. 2 of the Association for the protection of plants. (Geneva, 1884.)

sent to him by Thomas of Bex. But his attempt was equally unfortunate. It remained for the immortal author of the *Flora Orientalis* to inaugurate in Switzerland the artificial rockery and a rational system of cultivation. The writer of these lines will never forget the impression made upon his childish brain by the sight in about 1869-70 of the famous gardens of Valleyres, though he was not able to examine them in detail till long after. They were a revelation to him. Some years before he had collected in the Jura *Saxifraga aizoon*, *Draba aizoides*, etc., and planted them in the wall of his father's garden; at Valleyres he saw the realisation of his own passionate desires. Between 1865 and 1870, Reuter, the Director of the Botanical Garden at Geneva and fellow-worker with Boissier, had rockeries constructed at the Bastions. The battle was won; and to-day any one who wishes may have some bit of rock-work peopled with denizens of cliff or mountain.

But soon lovers of nature were alarmed to mark the ravages committed by collectors in the neighbouring hills; peasants of Savoy or Valais might be seen bringing baskets full of uncommon species for sale in the Geneva market, and it was only too certain that several classical habitats of rarities were becoming exhausted. In 1883 a society for the preservation of alpine plants was formed among members of the Genevese Section of the S. A. C., the last of whose annual reports has just appeared, the society having amalgamated with the *Ligue Suisse du Naturschutz*.

From the first this association of patriotic enthusiasts set about the work of encouraging the cultivation of alpine plants among professional gardeners, urging them to raise these species from seed and to sell them at low prices to amateurs. MM. Edmond Boissier, Alphonse de Candolle, Eugène Rambert and Dr. Christ vigorously

advocated this policy in committee¹, with the result that a long period of fumbling ended and the garden of acclimatisation² was founded at Plainpalais. For eighteen years this garden distributed plants and seeds throughout the world; in 1902 it was removed to Chêne, where under the name *Floraire*, taken from the Latin *Florarium*, it has been reorganised on a commercial basis.

The Geneva association has done a great work in preaching the protection of rare plants. It was the first to lift a warning voice on behalf of species whose existence was threatened and to give a practical turn to the talk about acclimatisation by promoting the foundation of the gardens mentioned. A tide of popularity set in, which is spreading the artificial rock-garden and *alpinum* over the civilised world. How rapidly this fashion, which has an artistic no less than a scientific and horticultural side, has extended, may be measured by the following fact. In May 1887 the writer, who was cultivating alpines in his property at Yverdon (Vaud), exhibited a small collection at the spring show of the Geneva Horticultural Society. The exhibit caused great surprise, and the Committee was hard put to know in what class it should be placed. Two years later Geneva counted more than fifty rockeries devoted to alpines. At the present day these plants have a place assigned to them in all shows on the continent, in England and the United States. Their culture is the subject of many conferences and lectures, both popular and esoteric for the instruction of professional gardeners. Botanical gardens, with few exceptions, have their alpina or at least their alpine rockeries. In a word the cult has won its position as a

¹ Bulletin no. 2 of the Association for the protection of plants. (Geneva, 1884.)

² Bulletin no. 20 of the Association for the protection of plants. (Geneva, 1884.)

branch, and not the least important branch of practical gardening. Certainly the most fascinating and the most scientific—but not “ornamental” nor indulgent to the extravagancies of those with a weakness for “big” effects.

For all this, it is not a difficult branch to master nor one that should be considered the portion of aristocrats in the world of “gardening gardeners”. Observation and intelligent interest alone are required.

There is a wrong way of proceeding—wholly condemnable. You uproot a plant on the mountain and remove it straight into the garden. Ten times in a hundred, as a rule, you may succeed, not oftener, because the time chosen is usually the season of inflorescence. Down you bring your treasures in triumphant confidence, only to be disappointed of your hopes again and again. The reason is easy to guess. Do we ever set about transplanting a rose or other such plant under a full summer sun, in the time in bloom? Yet this is how we treat the mountaineers in bulk. We see them flowering; promptly admire and as promptly tear them up. When their charms disappear, we cannot tell one from another and no longer care about possessing them.

Methodical procedure, governed by common sense, is essential, if we are to remove into our gardens with any chance of success a native of the heights. First the change must be made during the resting season. Therefore we must learn to recognise our favourites when there is nothing but the foliage and the general look to mark them from their neighbours. This knowledge is quickly gained; one soon acquires a kind of instinct or flair which helps us to seize at once upon the characteristic differences between species. Then the plant must be submitted to an acclimatisation, that is, it must receive a special treatment by which it gently grows accustomed to the novel cli-

matic conditions. During this period, so far as may be, regard should be paid to anterior environment, and the plant should be led step by step to the new state of existence. Most alpine plants are kindly creatures and respond to treatment; still there are kinds that call for serious precautions.

Not till the close of the annual cycle, when seed is ripening and the sap flows sluggishly, should one think of moving a plant to lower levels. Fortunately—very fortunately for this work—the roots must now be cleaned from all adhering earth, since the new environment calls for a corresponding change of soil. The roots, however, should, so far as possible, be preserved intact, to aid them in taking a new hold readily, and it is better to take up young plants than old or full grown ones. Here is the place for garden-craft, an art that cannot be learnt from books nor taught by lessons, but one of rapid growth, given an observant nature and an intelligent insight into natural processes combined with a love of plant-life. I will only say that a sandy, well drained soil is wanted, that everything must be avoided which may cause decay, that the protection of a frame is desirable, that shade be given by day and a little air by night—in a word we must seek to establish an equilibrium between absorption and evaporation and to maintain our patients in a state of perfect balance between what is taken in and what is given out.

Little by little the plants should be exposed to air, dryness and sun. During the first winter it is well to allow them quietly to push out tender rootlets and strengthen their underground system. In severe frosts they must be covered with moss or branches of fir. With spring move them into pots or pans according to their size, let them take hold in a cool frame, and finally plant them in their permanent quarters. In the latter part

of this work, which contains descriptions of the different species, instructions are given as to the aspect in the rockery proper to each and the most suitable situations in the garden.

Proceeding thus, one may in twenty-five per cent of cases expect success with the great majority of alpine or even of arctic plants. At Floraire we have established many plants received from Canada, the Caucasus, Siberia, Norway, Lapland, and indeed New Zealand; and we have been able from it to supply rare and capricious species to many private collections and public gardens.

Tap-rooted species—Gentians of the group *lutea*, Sea-hollies (*Eryngium*), Anemones of the group *Pulsatilla*—are impatient of removal and should be brought into cultivation by means of seed. This, moreover, is the method indicated by our great teacher Nature, whose suggestions must be regarded and her example followed.

Seed is the rational way of establishing perennial alpine. After now testing it practically for a quarter of a century and finding it to give the best results, we recommend it to clients in distant countries who prefer to raise their own plants. It is the most rational method, just because it is the most natural. No doubt it is a slow one and demands attention, at which many may flinch; yet it is simple and certain, though perhaps not at the command of everyone, for some appliances are required to ensure complete success.

The chief points to observe are a light, sandy soil, with just enough nourishment to provide the food necessary for the growth of young plants. I myself use one third old and rotten leaf-mould, well riddled to free it from grubs; one third turves or sound arable land; one third granitic or calcareous grit, according to the affinity of the species. The best time is autumn, and the seed should be fresh gathered.

With many species an immediate sowing is imperative ; for example, *Anemone Pulsatilla*, *Adonis vernalis*, the blue thistle (*Eryngium alpinum*), *Polygonum*, *Primula*, and some *Gentians*. Sown directly after harvest, the seed of these species—and of others as well—germinates at once and freely. They pass the winter in the cotyledon stage, busied in building up a strong body of roots. Defer sowing till spring and you will find them very slow, perhaps a year, in germinating. The general sowing, however, may be made in the spring ; but early, very early, for the plants must be up before the hot days of summer.

The seed is sown in pots, pans or boxes, with ample drainage ; or, for that matter, especially the seed of vigorous kinds, in open ground under a frame, or without protection in a sheltered border, where shade can be given. Care must be taken to cover the seeds (especially if minute) very thinly, barely with their own depth of soil. The receptacles should be placed under glass in a cold, dry, clean frame. If possible, they should be covered during winter with snow. This is most advantageous ; for the process of germination is accelerated. My own observations and experience are conclusive on this point, and I have no hesitation in saying that snow has a real influence on sowings of mountain plants¹.

But in countries where snow is an uncertain quantity, it is wise to defer till spring the sowing of those species which germinate promptly, and to expose the seed to the warm showers of that season. No harm is done if the pots are thoroughly drained. In a very dry, continental climate², that of southern France for example, it is

¹ See chapter on "Sowing" pp. 21 *et seq.* H. Correvon's. *Les plantes alpines et de rocailles*.

² M. Correvon implies that this procedure is not suitable for an English climate. This is unquestionably true. An attempt to use sphagnum would probably not be only useless but prejudicial or worse. *Ed.*

advisable to add to the compost a little sifted sphagnum, in order to give a spongy, porous consistency which will secure constant and regular "humidification". Sphagnum here takes the place taken in nature by rock, absorbing and retaining the moisture, which it gradually imparts to the surrounding soil. Of all matter it is par excellence an hygrometric regulator.

The quickest seeds to germinate are those of *Helianthemums*, *Violaceæ*, *Cruciferæ*, leguminous plants, *Columbines*, *Geraniaceæ*, and some of the Poppy family. Next come *Compositæ*, *Caryophyllaceæ*, *Potentillas*, *Onagraceæ*, *Crassulaceæ*, *Labiataæ*, *Scrophulariaceæ*, *Campanulaceæ*, etc. The slowest belong to the *Umbelliferæ*, *Gentianaceæ*, *Iridaceæ*, *Primulaceæ*, and particularly to the *Berberideæ*, the *Fumariaceæ*, and a section of the *Ranunculaceæ* (*Pæonies*, *Aconites*, *Hellebores*, *Pulsatillas*).

Sir Michael Foster, the celebrated English iris-enthusiast, showed me on April 28, 1905, pots of Iris which he had under observation; in some of them seedlings were showing after thirteen years of close attention¹. Since then he has recorded in the *Gardener's Chronicle* the germination of a sowing made fourteen years before.

One is too ready to count as lost a sowing which does not come up in a few months. At least a year should be allowed before any pan is thrown away, even in the case of families of ready germination, and two years in case of others. In 1890 I received seed of *Heracleum Mantegazzianum* sent by MM. Levier and Sommier of Florence from the Caucasus. This noble plant would never have been introduced into gardens, had I not kept the seeds for three years in the ground, hoping to see them come up; as they did—in 1894! Many beautiful species have

¹ H. Correvon's : *Les Iris dans les jardins*, p. 179.

been brought into cultivation of recent years from seed, simply thanks to the great patience of the sowers. My own experience with *Anemone sulfurea* and *alpina* shows that seed sown in the same month as it is gathered germinates in fifteen days, but not for three or four years if you wait twelve months or more.

When the seedlings are up and are gaining a little substance, they are transplanted separately at a fair distance from one another in a quincunx pattern. Later they are placed, as soon as they can stand complete isolation, singly in pots or on the rockery.

Alpine vegetation we have seen to fall, according to chemical affinities, into two great classes, the chalk-lovers and the chalk-haters. It is important, therefore, to know the nature of the species we are introducing, and to see whether their original habitat was chalk or granite, so that a congenial soil may be supplied. Plants in the second category are to be grown in the siliceous material commonly known as "terre de bruyère", in peat or leaf mould. For the others one has a choice of numerous composts of rotten vegetable matter taken from crevices in the chalk, or in leaf-soil with an addition of finely broken chalk to make good the initial lack of lime, or even in good, sound pasture land or loam, mixed with chalky detritus or leaf mould.

Sphagnum, which is so valuable in the culture of exotic orchids, may be used with equal success in growing plants from the high mountains. In the *Revue des Sciences naturelles appliquées*¹, the *Journal de la Société royale d'Horticulture de Toscane*², and in the *Gardener's Chronicle*³ I have given full instructions on the subject, and will refer

¹ *Bulletin de la Société Nationale d'Acclimatation de France* (1904).

² *Bollettino della R. Società toscana di Orticultura* (1904).

³ *Gardener's Chronicle* (London, 18 April 1891).

to my papers there any readers who live in hot, dry climates, for whom this method is the only one to adopt. Indeed there are certain alpine species which cannot otherwise be cultivated in the continental climate of Geneva, but which under this treatment have given marvellous results. The sphagnum should be placed in baskets or pans pierced with many holes to allow the drainage to work freely. The object is to get a compost of a texture which will absorb moisture like a sponge and retain sufficient to counteract the ill effects of the sun by maintaining a regular and unfailing humidity about the roots and aerial organs. The vessel must be placed in a dry and well lighted situation, exposed to the full rays of the sun and deluged with water, for success depends upon the frequency of these waterings and the abundance of vapour formed around the plant under the influence of the sun. In this way, beneath a burning sun at Floraire, *Arnica montana* has been flowered, *Ranunculus glacialis*, *Eritrichium nanum*, *Soldanella alpina*, *Androsace glacialis* and *helvetica*, *Saxifraga biflora*, *Campanula cenisia* and *excisa* and many other of like nature.

Grit, calcareous or granitic, is also essential in the culture of alpine. Too rich a soil is, generally speaking, injurious to these species, which are for the most part of a frugal temper and ask for nothing beyond a porous soil, well drained and somewhat niggard. The most richly habited among them, those of the most vivid and radiant splendour, live as a rule in crevices among the rocks, between stones or on glacier moraines—all hungry habitations. The earliest denizens, the pioneers to invade the moraines after the retreat of the glaciers, are often those which put on the most glorious attire. Examine the soil in which they bury so deep the myriads of long, long rootlets, and you are surprised to find that it is sand or gravel almost unadulterate.

In a word the question of the acclimatisation of alpine flora has ceased to be one of mystery for practical gardeners. Their culture has taken a place in our life, and its special devotees are the people of taste, of refined and artistic temper.

The Duke of Argyll, when presiding in 1867 at a meeting of English horticulturists, told how Queen Victoria as she walked once with him on the Scottish hills, gathered the mountain flowers and confessed a passion for them. He added that if gardeners won their way to tame every kind of plant, still the fairest of them all, the people of the high hills would be rebels. He was wrong; were Her Gracious Majesty alive to-day, she might admire on the terraces of Windsor Castle almost the whole of our alpine flora, acclimatised at Floraire and moved to Windsor by the careful efforts of a distinguished amateur, General Sir Deighton Probyn, Keeper of the Privy Purse to His Majesty the late King of England.



Alpine Gardens and Rockeries

We have seen that the system of building rockeries for the accomodation of mountain plants dates, at least in Switzerland, from the moment when Boissier opened his rock-garden at Valleyres (between 1852 and 1870). About the same time the botanist A. Kerner, Director of the Innsbruck Botanical Garden, laid out, for the cultivation of the flora of the Tyrolese Alps, an elaborately planned model, both in their forms and in their composition, of the eight mountain masses of Tyrol. Where the object in view is scientific, such an arrangement is most

helpful, for it allows the geographical and geological distribution of the plants to be grasped at once.

A series of several distinct rockeries, each with a character of its own, is far superior to one gigantesque creation; the effect is more pleasing to the eye—in other words, is more natural—and the plants will live in better health and comfort. The enormous erections, with which we are familiar, “à la Mont-Blanc” (as they have been called), are not really picturesque in any sense, and have several very real disadvantages. A system of little structures, scattered over a slope or among turf, has everything in its favour. Once, I admit, — it was long ago—I built a Cyclopæan chaos of stone in my alpine garden on the Dancet road, and very quickly recognised that such huddledoms have neither artistic merit nor practical utility. To seek to copy nature—more and more, closer and closer—that is the final confession of my faith.

A chapter is given to this subject in an earlier book of mine, *Les Plantes des Alpes* (1884). The many flattering notices, which I then received, have urged me to continue in the same path, nor have I ever wandered from it. In a later work (1889), a monograph on Hardy Ferns, the beauty of natural gardens is again emphasised (see chapter XII : “Ferns in the wild Garden”). I mention this, however, not to claim such ideas as my own; for my sole merit is to have adopted them from my mother and from English artists, my fellow-disciples of the great æsthetic teacher Ruskin.

Twenty years ago this style was a common laughing-stock. Since then it has been taken into favour and we have seen landscape gardening, which in France, Switzerland and elsewhere had remained sunk in muddy traditions that England had rejected for more than a hundred years, make immense strides—in fact, entirely revolutionised. Our most accomplished craftsmen have at last

understood and accepted the English style, that is, the art of embosoming groups of hardy plants among greenery and lawns—of using them to create one or more pictures suggested by natural scenery. Mosaic carpetbedding, a monstrous invention of some unnameable evil genius, false in taste and false in art has had its day or, at least, is taking itself off to the limbo of memories belonging to the formal garden of topiary yews and scissored shrubs.

William Robinson, the great English master, writes in the preface to his work on *Alpine Flowers*¹: “Much improvement, both in design and cultivation of rock-gardens and rock-plants, has taken place within the past twenty years or so, and some effects on these rock-gardens are now seen that were impossible on the old form of “rock-work”, with its dust-dry pockets and hopeless ugliness. At the Friar Park, Henley on Thames, South Lodge, Leonardslee, Warley Place, Batsford, and many other places, we may see not only the rarest alpine plants admirably grown, but effects and colour not unworthy of the alpine fields. Even the public gardens where the most grotesque arrangements were common have changed much for the better”.

All these gardens which Robinson here speaks of as models are familiar to me. Leonardslee, the home of Sir Edward Loder, is among the happiest of artificial rockeries. It were hard to find anything more natural, more majestic, or better planted. At the time of my visit this magnificent garden was gay with every kind of alpine, brought from the four corners of the world. One charming picture I remember, *Atragene* falling down in cascades of pure white blossoms².

¹ W. Robinson : *Alpine Flower Gardens*; 3rd edition (1903).

² Since I wrote these lines I have again visited Leonardslee and given a short account of my impressions in the *Gardener's Chronicle*, July 16 1910, p. 34.

South Lodge is one of the best alpine gardens which I have ever seen. Surrounded by a noble frame of shrubs and trees, the rockeries are truly magnificent. The grouping is most artistic and the harmonies of colour most effective. Herbaceous and alpine plants alternating with the shrubs give life and brightness to the whole and the inartistic error of monotonous and uniform planting in masses is avoided, which may prove an owner's wealth, but not his taste. I saw there the choicest of alpine—indeed the best of plants from every part of the world. *Myosotidium nobile* (the giant New Zealand Forget-me-not) found a splendid foil in the orange flowers of *Lithospermum canescens*; the superb new-comer from Chili, *Crinodendron Hookeri*, hung deep red blossoms upon a carpet of *Linnæa borealis*—an exquisite miniature of colour; the rare and wonderful *Rhododendron Kamschatcicum*, imported from Flourens but far outgrowing mine here, stood beside the Australian marvel, *Grevillea alpestris*. Particularly good too, were *Ramondias*, *Meconopsis* and terrestrial orchids—the latter, indeed, perhaps of all I have seen in England second only to those at Friar Park.

Batsford Park is the creation of a real genius. Lord Redesdale is well known throughout the horticultural world as one of our most enlightened patrons. The park lies on a wooded hill, planted with every kind of tree that can live in the mild climate of Gloucestershire. Against this background all that has beauty in the vegetable world—acres of *Narcissus*, *Squills* and *Jonquills*—fields of the fairest *Primroses* (and in dazzling *Primroses* the English are acknowledged connoisseurs)—are grouped with perfect skill and truth to nature. The ground for acres is carpeted with *Heaths* (*Erica carnea*), sheets upon sheets from February to May of vivid pink. All around noble conifers from every country lift their dark clean-cut outlines. There are exquisite trees and shrubs;

masses of Bamboos (here Lord Redesdale's collection is complete), luxuriate on all sides in the generous and kindly soil. There is a Japanese garden, filled with priceless treasures from the empire of the East, where the Earl at one time was ambassador, and over all a great bronze statue of Buddha watches, calm and strong, as guardian spirit over all. Elsewhere there are undergrowths of Ferns and Himalayan Pæonies, banks of perennial plants and miscellaneous Heaths, glorious Magnolias, with flowers most wonderfully contrasted against the sombre green of American or Chinese pines.

Here and there, each according to his necessities, are placed the modest representatives of our alpine flora. Yet the owner has his grievance; he sighed, when he showed me round this wonderland, over *Gentiana verna*; it was not for him. Can one, in this world, ever at once have all things? There must, it would seem, be impossibilities in the path of even the all-successful.

But I must leave half the marvels and glorious sights untold. Over all stand the picturesque outlines of the old Scotch firs, as if to seal the heterogeneous, heteromorphous assembly with the stamp of its British home.

I have described elsewhere¹ the splendid gardens at Warley Place. In them a true artist displays her accurate and deep knowledge of plants—I except none—united to astonishing experience of practical gardening. Miss Wilmott is unquestionably the amateur, who in England (and consequently in all the world) has the best knowledge of bulbs and hardy plants. She has inherited the traditions of the Rev. Wolley Dod and Sir Michael Foster, whose unique collection of Iris and bulbs, the most beautiful and complete in existence, was given to her by the owner. The cause of gardening claims all her ability,

¹ *Les plantes alpines et de rocailles*, pp. 46-9.

erudition, fortune and talents, and, like Queen Anne, the only title Miss Wilmott cares to claim is that of gardener. Than the collections of hardy plants at Warley and at Tresserve, on the shore of Lake Bourget, nothing more comprehensive is to be found. The manor-house of Warley lies in one of the sunniest and driest parts of England. The grounds were laid out and planted toward the end of the seventeenth century by the celebrated writer Evelyn. Here in surroundings naturally diversified a valley has been excavated by the châtelaine, and in this artificial valley an excellent rock-garden built, traversed by a mimic alpine stream. The whole is planted with an exhaustive and world-wide collection of mountain flora, well worthy of the cosmopolitan reputation which it has so quickly won.

On the borders of Yorkshire and Lancashire, Lord Henry Bentinck, younger brother of the Duke of Portland, has constructed, in his magnificent estate at Kirkby Lonsdale, a garden of great beauty and vast extent where alpine and shrubs are grown among natural conditions. To reach it, you are ferried across a stream of considerable size, from the edge of which the garden stretches over four acres to the foot of a noble wood of immemorial trees. Scarcely yet twelve years old, the place already blends with the surrounding landscape. Enormous clumps of *Gunnera scabra*, *Saxifraga peltata*, *Lythrum* and glorious foliage plants of every kind enliven the banks of a torrent which tumbles down the slope, spreading here and there along its course into many little swamps. In the less marshy places stand stately groups of ornamental Rhubarbs, architectural masses of Monkhoods and Knotweeds, chief among them the fair Himalayan species *Polygonum molle*, innumerable golden-orbed Doronicums, Senecios, Ferns most manifold, which often reach to wonderful proportions. The drier, sunnier spots are carpeted with

Heaths, mediterranean *Cistus*, and the whole family of *Ericaceæ*, from the Australian *Pernettya* to the arctic *Phyllodoce*. Associated with these flowers the Greek *Acanthus*, *Artichokes* and *Cardoons*, welcome for their glorious blue heads of bloom as much as for their ornamental foliage ; *Onopordons*, in particular the marvellous Asiatic species *bracteatum*, whose dead-silver leaves and glistening thorns, rising in this northern landscape, give to it a touch of characteristic southern heat. The nobly habited blue Thistles of the Old World (*Eryngium alpinum*, *amethystinum*, *Bourgati*, *giganteum*, *maritimum*, *planum*, etc.) confront in proud magnificence their relatives from America, so poor in grace and so dingy of hue. Such is the wonderful frame within which a motley multitude of choicest perennials, rivals in brilliance and charming elegance, *Monardas*, *Veronicas*, *Delphiniums*, *Scabious*, *Salvias*, *Columbines*, *Asters*, *Centaureas*, *Rudbeckias*, *Silphiums*, *Leucanthemums*, *Penstemons*, *Lychnis*, etc., make a vast flowery paradise to which the shimmering iridescence of the tiny alpine plants, the *Gentians*, *Ranunculus*, the *Primulas*, *Soldanellas*, *Edelweiss* and *Myosotis* lend their clear, pure tones. Here and there boldly rise cool and shady masses of shrubs from every climate, hardy *Fuchsias*, *Cotoneasters*, *Hortensias*, *Spiræas*, *Laurels* (unfortunately not frost-proof at Geneva) and a whole miscellaneous world of fragrance and of bloom. The garden is Lord and Lady Henry's favourite hobby ; they have designed and built it with the assistance of a head-gardener, who bears the time-honoured name of Miller¹, and spends much time and pains upon it.

¹ Miller, an English botanist, gardener and writer, was author of several books, of which one, the *Gardener's and Florist's Dictionary* (1724) is still a standard work.

Very different is Sir Frank Crisp's celebrated alpine garden at Friar Park, Henley on Thames, near Windsor. Here in a temperate and rather humid climate Sir Frank succeeds in growing almost the whole of our mountain flora, so that it is easier to say what is missing than what is not. All lovers of plants have seen views of this wonderful creation. The alpine garden alone, of which I have given a full description in the *Garden*, covers an area of four acres; the rocks, ten thousand tons or more in weight, were brought from Bradford, and have been admirably grouped into one harmonious picture.

In this genial air, rich in moisture and almost equable in temperature, alpinists flourish excellently. Except for some species from the greatest heights, more particularly *Androsaces* of the group *Aretia*, all the collection is thoroughly at home and flowers well in a grandly arranged and sun-bathed rockery. The general plan, designed by Sir Frank Crisp and executed under his supervision, is copied from nature, being a miniature reproduction of the Matterhorn and his supporting spurs. The whole effect is unique, and the secret of its beauty is harmony of line, and, above all, balance of size between the plants and the rocks. The eye receives a perfectly proportioned view, every detail of which is to a determined scale—a point too often forgotten in this style of work. The larger plants and those of massive foliage are placed at the bottom, and by successive terraces, which rise most naturally tier on tier above the hollows, one passes to the absolutely dwarf, shorn vegetation at the base and on the scarps of the central peak.

The main valley is hollowed by a murmuring stream, which falls in a series of cascades from the base of the Matterhorn to an alpine hut, built in the valley beside a tarn gay with mountain aquatics. Sitting at evening on one of the gigantic stones which form the stages of this

splendid work, the writer asked, as he admired the outlines and drank in the refreshing air, Whence, whither had he come, to enjoy this truly alpine scene? Had he really crossed the whole of France, the Channel and the south-east of England? In spirit he was carried to the High Alps.

This is the grand, master style; the only way, that is truly artistic, of making an alpine garden. First and above all, the scene should calm the mind and set it in the presence of the true spirit of the hills, not of that bastard mockery which is born of the phantasies of certain landscapists. It is not sufficient to introduce the mere painting, that is to say, the brilliant flora of the heights; the framework also must be true—a home-like setting on a mother alp, a sense of enfolding nature, mountain nature, in her most majestic and pictorial form, where water-worn and frost-splintered masses are flung around in grand and balanced negligence. Embed the plants in moss and mountain grasses; group them cunningly in a harmonious, everblending symphony of many-coloured clusters, without a crude tone to offend the eye; throw a rustic bridge across a stream that murmurs between rocky walls, whose huge blocks, fretted by the waters and the rust of ages, are spread along the bank or on some upland pasture; give to this pasture a soil that leaves the herbage dwarf and smooth, enamel it with alpine flowers, and spare it from the scythe; arrange some little masses here and there, whose native outcrop alternates with the grander architecture of the framework, that gives law and being to the whole; set in these separate rockeries the flora of peak and of field, of wood and of cliff—with due regard for the particular needs of each—such is something of the task before the designer of an alpine garden and the landscape builder, who would wish his work to be an artistic one and natural.

Nature then must be our model; but we must only take what she offers of beauty, for there are in nature uglinesses also—to be avoided. Jean-Jacques Rousseau went too far when he required in his ideal garden a place for nettles!

It all depends on taste and on sound judgment; conventionalities of fashion must yield to individual liking, to architectonic laws and artistic instinct. The skill of the landscape-gardener who ventures on this class of work, will be measured simply by his success in reconstructing pictures from the region of the mountains and lower alps, with an occasional bold excursion into the grander rocky desolation of the highest—the true alpine—zone¹.

I could multiply examples; for it is England in which the love of flowers is quick and living—the one country where gardens are counted things of pride and worthy of sacrifice. Scattered over this ancient and wealthy land are a hundred other alpine creations, which, did not space forbid, might well challenge my feeble pen to songs of praise. Yet there are still some, where the collections are of outstanding interest. I have a vivid memory of two near Lancaster. Mrs. Saunder's garden at Wennington Hall is a triumph of the simple style—modest in extent, severely utilitarian in design, but rich beyond words in floral wealth. Here the choicest of the choice, the exclusive alpine aristocracy, the most ill-conditioned of reputed “miffs” respond to the personal attention of their mistress. The following list speaks for itself — *Aquilegia alpina*, *Eritrichium nanum* (from seed), *Androsace glacialis*, *Helvetica*, *pubescens*, *villosa*, *Vitaliana*, *Azalea procumbens*,

¹ Friar Park is open to visitors in the months of May to September inclusive, on Wednesdays. The price of admission is sixpence which are divided between The Convalescent Fund of Henley and The Gardeners' Royal Benevolent Institution and the Royal Gardeners' Orphan Fund.

Phyteuma hemisphæricum, *Ranunculus alpestris*, *Anemone sulfurea*, *Arnica montana*, *Trifolium alpinum*, *Gentiana bavarica*, *brachyphylla*, *verna*, *alpina*, *Soldanella*, and a complete collection of *Primulas*.

At Lancaster itself we find another English triumph of another kind—over adverse situation. Imagine the most delicate alpine thriving within two miles of the sea! The nobly shaded slopes command a glorious view. Beneath a wood that is almost Swiss in character, among an undergrowth that suggests the virgin forest, our mountain ferns flourish with a luxuriance that exalts them to the *macroflora*. Needless to say that the excess of aerial moisture thus indicated does not make things easy at Bailbrigg, but Mr. Storey has solved the difficulty by buttressing the terraces below his house with retaining walls of local stone and has transformed these walls into an alpine garden of the highest excellence¹.

But of gardens in the United Kingdom, which I have had the pleasure of visiting, the most astonishing, whether one regard it from the completeness of contents or excellence of management, is the Botanical Garden at Edinburgh under the direction of Professor Balfour. I am not going too far in saying that it is perhaps the richest collection of rock-plants in the whole world, the true method also of cultivation being so well understood that I myself have been able to take lessons there. The choicest alpine jewels may be seen growing in perfect health which we are not able to preserve at Floraire, though we endeavour to cultivate for sale at home or abroad the whole range of mountain perennials. One may pick out in particular *Diapensia lapponica*, which I have given up attempting to acclimatise except by seed and have never kept more than a year, *Rubus chamæmorus*, *Primula*

¹ See *Gardeners Chronicle* July 9. 1910. p. 13.

purpurea, etc. Others, e. g. *Omphalodes Luciliæ*, *Armeria cæspitosa*, are as fine as at Floraire in spite of a more unsuitable climate, and it is only the highest *Androsaces* which do not succeed under the magic wand of the Professor.

Reference was made at the close of the last section to the Norman Tower rock-garden at Windsor Castle created by General Probyn. It was much appreciated by the late King and by Queen Alexandra, and I am delighted to know that King George has graciously consented to make no change as to its maintenance. Of this interesting and tasteful garden one sees only a portion on the right from the road mounting to the Court of Honour, below the retaining wall. To appreciate its merits in full one must roam over the side-paths (strict privacy, however, is maintained) and know all the twists and turns and corners. Here at the foot of the Castle, in chinks of walls and artificial rock-work, may be found some of our most delicate alpine plants. They were, without exception, sent out from Floraire and I can appreciate their worth, inasmuch as I inspect the garden every spring. The collection is to-day a notable one in all respects and a word of praise is due to the gardener in charge.

In many alpine countries nature has facilitated the construction of beautiful alpine gardens. These are very different from the English types above described, and have cost less trouble and are easily established.

The one known as the *Linnæa*, at Bourg-Saint-Pierre (1700 m.) was founded in 1889 by the Society for the Preservation of Plants. It occupies an isolated, fully exposed hummock, eight to nine acres in extent. Paths run in every direction, and there are numerous natural and artificial rocks, assigned to the flora of the different mountains of the world. The plants are classed geographically, and the whole effect is very picturesque. Chalk-hating

species flourish exceedingly in the granite soil. The garden *Rambertia* is a rocky enclosure on the eastern ridge of the Rochers de Naye (2000 m.). The soil is chalk. This garden was established in 1895 by the Société de la *Rambertia*, and contains a most comprehensive collection of all chalk-loving alpine. At Pont de Nant, above Bex (1300 m.), a botanical garden, affiliated to the University of Lausanne, was opened in 1893 by the efforts of the neighbouring commune. It is situated in a well watered, shady and charming position at the foot of the rock wall below the Muveran. The design is the work of Professor Wilzcek and has not needed the assistance of a professional adviser. In Italy M. Fernand Correvon, a Genevese landscape architect, has laid out for the Silvestri family of Milan a garden on the slopes of Monte Scanapa, at the foot of pleasant Presolana, which preserves so perfectly the dolomitic characteristics of the general landscape that it is impossible to tell where the artificial rock-work passes into the natural, which forms the ribs and skeleton of the whole.

Other gardens have been built in the high alps, but they make no pretension to be more than botanical or pleasure gardens. To mention one: M. Anzevui's collection at Arolla (1962 m.) enables the many visitors who stay at this charming alpine resort to find side by side, in half an acre's space, the flora of Swiss and other mountains, growing with rude and vigorous health.

The botanical garden of Professor Lachmann, of Grenoble, at Lautaret in Dauphiné, is a complete success. Professor Flahault of Montpellier has built three at once on the slopes of Aigouäl, in the Cevennes. In Italy the gardens of *Chanousia*, on the little Saint-Bernard (2200 m.) and of *Rostania* (1300 m.) are the oldest and best known. Indeed alpine gardens are springing up in Austria, Bavaria

and over all the European chains¹. Generally the situations chosen are places of easy access, near to hotels or mountain huts. While they help in spreading a scientific knowledge of alpine flora, they also serve the end which I have here proposed to myself—to teach the love of the little mountain plants, the true stars of our Alps.

(According to a report published early in 1910 a national park for the preservation of indigenous fauna and flora is to be established on a large scale in Switzerland. It is stated that a vast area lying between the lower Engadine and the Munsterthal and comprising the valley of Scarf and the neighbouring vallies has most generously been offered for this purpose at a nominal rental by the commune of Zernetz. *Ed.*)

¹ See on this subject the Report of the first Congress of Alpine Gardens, held at the Rochers de Naye in August 1904, under the presidency of Prince Roland Bonaparte. (Geneva, 1904.)



DESCRIPTION OF SPECIES

* signifies found in England.

§ signifies that the species is not truly alpine or sub-alpine, in the sense that typical and full development is only found in alpine or sub-alpine regions.

The above symbols are inserted by the Editor, who alone is responsible for any error in their use.





Ranunculaceæ



THE typical forms of this numerous order are the familiar golden buttercups. Many of the included species are true mountaineers; most are perennial, some climbing or shrubby. The leaves are opposite, except among the Clematideæ (alternate); the flowers sometimes regular, as in *Anemones*, sometimes irregular, as in *Aconites*; a distinct corolla and calyx are often wanting, but there is often a flanking involucre or whorl of bracts half-way up the stem. The stamens are numerous; the ovaries of varying number; the fruit one-celled, one-seeded (an achene), except in *Actæa*, where it takes the form of a berry.

Atragene alpina

Eng.: Alpine clematis; *Fr.*: Clématite des Alpes; *Ger.*: Alpenrebe.

A climbing shrub not unlike a clematis, with leaves composed of 7-8 irregularly divided leaflets. The flowers are large, solitary, with 4 lilac-violet, petal-like sepals, the true petals being very minute and forming a compact corona at the base of the flower, where they serve as nectaries for fertilising insects; the seeds are furnished with long, whitish, feathered awns. Varieties with pure white, red and rose flowers are found. May-June: bushy parts of the alpine region, 400-1000 m. Rare in Switzerland: Grisons, Fribourg, Salève (beyond the frontier).

A fine climber, growing to the height of 10 ft., or to be employed with striking effect as drapery on some bold

ledge. Of easy culture in loam admixed with coarse sandstone grit and leaf-mould, under partial shade or an open N. W. bank. Propagated readily from seed or by grafts on the clematis root-stock.

Thalictrum

Eng.: Meadowrue; Fr.: Pigamon; Ger.: Weisenkraute.

A group of plants distinguished by numerous, prominent stamens, which form the beauty of the flower, the petals being very fugacious. The commonest garden species is *T. aquilegifolium* which succeeds magnificently in a cool, partially shady position and a light soil, and whose nodding 5 ft. scapes with glorious masses of white or lilac are splendid ornaments to rockery, border, or underwood. Of other species *alpinum* and *minus* are worthy of cultivation, but the flowers are as well removed; indeed in all, perhaps, the greatest charm is the delicate tracery of the leaves. All prefer limestone, except *alpinum* which requires a select peaty nook. Multiply by seed or division. The medicinal value of certain species has been highly spoken of in cases of jaundice and intermittent fever; the roots furnish a yellow dye.

T. aquilegifolium (Pl. 1). A robust, tall shrub, with leaves similar to those of columbines, but more refined; flowers small, very numerous, in a large panicle, the countless lilac or white stamens spreading like a mist above the plant. April-May. Cool mountain places.

Other species are: *T. alpinum**, a wee herb, with simple, naked stem, not exceeding 4 in.; leaves like maiden-hair, the flowers small, yellowish and drooping in simple racemes; *T. fætidum* with viscous foliage of a strong, unpleasant odour; flowers small, reddish green, in terminal panicles; *T. saxatile** with zigzag, striated stem; foliage glabrous and scentless, with prominent nervation under-

neath; panicle pyramidal: *T. majus** to be distinguished from the above by its angular stem, with large, fine leaf-segments, and its somewhat umbellate panicle: *T. minus** by its leafless stem and smaller leaf-segments.

Anemone

Eng.: Windflower; *Fr.*: Anémone; *Ger.*: Windröschen.

This genus is easily distinguished by the regular flower, whose envelope is a coloured perianth composed of at least 6 petaloid sepals; petals wanting; inflorescence solitary or umbellate; the seed-vessels are globular-headed carpels, terminated by a short beak, a plumose beard, or in some cases enclosed in a woolly envelope. It falls into three natural groups: (a) *Anemone* proper, including *baldensis* and *narcissiflora*, whose non-plumose seeds germinate well; propagation by division may also be employed; (b) *Pulsatilla*, including *alpina*, *sulfurea*, *Halleri*, *montana* and *vernalis*, with woody rootstocks, not matted and fibrous as in the first section, and consequently most impatient, when mature, of removal. Seedlings however bear transplanting, and the plumose seeds germinate readily, if sown as soon as ripe; (c) *Hepatica*, also easily raised from the smooth seeds, except the double varieties.

A. alpina (Pl. II). Stem villous with silky hairs, lengthening sometimes after florescence to nearly 20 in., and bearing half-way up a whorl of bracts very similar to the radical leaves; flower large, internally pure white, externally bluish. May-June. Pastures and debris in the limestone Alps and Jura.

In soil destitute of chalk the flower takes a pure yellow tone, the leaf becomes less foliated, the stem more glistening and browner. This variant is called *A. sulfurea* (Pl. II).

The two species are widely spread over the whole alpine chain and are among its most brilliant ornaments. Unfortun-

ately they are somewhat difficult to grow at lower levels. It is necessary to raise them from seed, as we have done at Floraire with good results, and transplant them as soon as they are 2-3 years old in deep, spongy soil (without lime for *sulfurea*), and in half shade. When buying plants, it is essential to insist on stock raised from seed, for full-grown plants are seldom removed with success. In England, however, full sun is necessary, and *sulfurea* should be accommodated with sandier loam. Both should be top-dressed when dormant in autumn with loam and leaf-soil deep enough to cover the crown. As *sulfurea* grows from the crown, and not from offsets, as *alpina*, great care must be taken to preserve it from accidental injury during the time of rest.

A. pulsatilla §*. A charming flower with erect cup of violet-blue, enclosing a sheaf of golden stamens and with silky hairs on the outside; the involucre is very hairy and half-way up the scape. It flowers about Easter and is one of the fairest jewels on the foothills of the Jura Vaudois, from Romainmôtier to La Sarraz, on the slopes of the Chaumont above Neuchâtel, though now rare in this locality, and extending into the Jura of Canton Basle.

The culture is of the easiest, given full sun and deep but lightish soil. It is apt to grow coarse under cultivation and may rot off at the collar if exposed to excessive moisture. Both dangers may be minimised by working coarse grit among the stems soon after they appear. It should not be disturbed when dormant. At Floraire a most delightful variety, with flowers of purest white, is cultivated. Lilac and rosy-brown forms also are grown; the last is a glorious fellow, but rare. The introduction of this species into Britain has been attributed to the Romans.

A. montana, a Valaisian congener of *Pulsatilla*, differs by a smaller, drooping flower, of deep violet, and has more finely divided greyish leaves. After the normal inflorescence of spring it frequently blooms a second time in autumn. Both are poisonous, and used medicinally for affections of the skin, syphilis, paralysis and eye-diseases; they are also much employed in homœopathy.

A. Halleri is distinguished from the last two species by palmate instead of pinnate leaves, silky hair and gigantic flowers of fine reddish-violet with a peculiarly downy outer surface. Grows in dry and stony pastures of the Valaisian alps. (1600-2300 m.).

A. vernalis (Pl. III). Stem short; radical leaves hairy, palmate; involucre hairy, close to flower, which is large and erect, the divisions externally covered with a dense, bronzy nap. A true alpine, from the margins of moraines, on the rocky pastures of the non-calcareous alps (1600-2000 m.); among the earliest to flower, close on the melting of the snows. Of easy culture; requires a south aspect, fully exposed and dry, yet objects to scorching; the soil should be granitic sand, leaf mould and vegetable humus. Surface roots should be encouraged by prompt topdressing.

It is impossible to refrain from quoting Mr. Robinson's pæan of praise: "Two or three thin-looking, carrot-like leaves, lying pressed to the ground, then an inch or so of shaggy stem, all covered with the most lovely, bronzy-gold fur; then a fluffy cup of the same, and then, goblet shaped, sumptuous and splendid, a magnolia-like flower, snow-white within and silky without, a shimmer of gold and purple, iridescent with the most subtle sheen of lilac, fawn and pearl. The seed-head developes into a marvellous dandelion-clock". Surely all enthusiasts will for this face any caprice of such a beauty!

A. narcissiflora (Pl. III). This beautiful plant is very distinct from all our other species and approaches to the Himalayan and North-American kinds. The leaves are velvety, cut into long lobes; the flowers in apple-blossom umbels; the seeds smooth, flat and glossy, without plumose filaments; June-July, in pastures of the limestone Alps and Jura (1000-2500 m.).

Belonging to the fibrous-rooted section it is easy to collect and to propagate either by seed or division. It requires a porous, chalky soil, rich in humus and a somewhat shady position, but should be protected against moisture in winter.

A. baldensis. A small plant, with trailing, stoloniferous stem, a slender, downy flowerstalk, bearing deeply incised leaves and a solitary, erect flower of 8-10 divisions, pure white within and soft rose without; the fruit is bearded, forming an ovoidal head. July-August; moist rocky pastures of the Alps (1800-2500 m.). This is also fibrous-rooted and succeeds in a well-drained crevice, exposed to the sun, in a mixture of pebbles, leaf mould and peat.

A. Hepatica

Eng.: Hepatica; *Fr.*: Hépatique or Fille-avant-la-mère;

Ger.: Leberblume.

A small, woodland plant with persistent, thick, coriaceous, trilobate leaves, reddish on the underside; flowers blue, white or rose, with an involucre sufficiently near to simulate a calyx. Double varieties of each colour.

Flowers from March to May, according to altitude, and haunts the mountainous parts of all Switzerland, more especially in limestone districts.

It was introduced into gardens three hundred years ago and has proved one of their most precious ornaments in spring, for it grows excellently under shrubs or in the

skirts of woods and even in open borders, as it can endure full sun though preferring complete or partial shade. Any ordinary garden soil will satisfy its needs, but, being a deep rooter, it resents disturbance.

Ranunculus

Eng.: Buttercup; Fr.: Renoncule; Ger.: Hahnenfuss.

Flowers solitary, yellow, white or rose, with 5 sepals and 5 petals or more; carpels terminated by a point or short beak. The genus is very variable and widely distributed and comparatively few are worthy of introduction into garden cultivation. In addition to all the English lowland species, Switzerland contains a considerable number of true alpine, of which the best, perhaps, are *aconitifolius*, *alpestris*, *glacialis*, *parnassifolius*, *pyrenæus*, *rutæfolius* (for its magnificent foliage rather than for the flowers, which are dull and inferior to those of *alpestris*). *Amplexicaulis*, *bilobus* and *gramineus* are also good mountain types. Speaking generally all love moist situations or rather a moraine-like formation, with abundant trickling water in summer and dryness in winter. *Aconitifolius*, however, and *platanifolius* are haunters of shady and boggy ground. As regards sun, the majority are lovers of it, but glossiness of leaf indicates a preference for shade; the hairy-leaved species are sun-lovers. The runners formed by cherished kinds should be carefully pegged down and covered with light top-dressing and all varieties benefit by periodic division and replanting. Propagation, also, by seed is not difficult.

R. alpestris (Pl. IV). A glabrous plant, with glossy leaves, deeply cleft and with strongly marked nerves; flowers purest white; petals slightly crenate; stamens yellow. June-July: on rocky places of the calcareous Alps and

Jura; 1200-2000 m. Planted in a crevice of limestone, it flowers fairly well; give good drainage and partial shade.

R. parnassifolius is a low-growing plant with thick, prostrate stems; leaves thick, cordate, woolly at the edges, and carried on long petioles; flowers large, of dazzling white, arranged in 2-3 on the upper portion of the scapes. Flowers in June and July on stony debris of the limestone Alps; 2000-2500 m. To succeed with it, the soil should be a little heavy, and the situation open to full sunlight.

R. pyrenæus (Pl. IV). Stem erect; radical leaves linear-lanceolate, smooth, bluish-green, entire, erect; flowers white (the petals caducous) in 1-3 on the apex of the stems. June-July. Alpine pastures from 1000 to 1800 m. Culture: compact, deep soil; half-sun; never completely successful.

R. rutæfolius. Dwarf plant; bluish-green leaves spreading over the ground, much incised and a little like those of a Rue; flowers white, small, with many caducous divisions, carried on long, slender stalks. July-August: in cool spots of the Alps, particularly in the granite. 1900-2500 m. Culture: that of *R. alpestris*.

R. glacialis (Pl. V). One of the plants dearest to the climber, for its discovery tells that his pass or arête or peak is in sight. Leaves thick, shining, and deeply divided; stem fleshy, waved, reddish-brown in colour, prostrate; flowers 1-5, with a brown, villous calyx and a corolla, which persists till the seed ripens, of blush white, occasionally of bright rose, and passing after fertilisation into rosy copper. Flowers (July-August) in cool, stony places on or above the snow-line, having been observed as high as 4000 m.

Our mountain folk use it as a sudorific and as a blistering agent. The culture in Swiss lowlands is difficult. At Floraire we can manage it in a cool, pebbly position

under partial shade, but the inflorescence has but a ghost of the brilliance one knows high on the mountains. In England it proves easy, and I have seen it finely flowered in the neighbourhood of London. It requires a well drained sunny slope, and soil composed of leaf mould, sand, loam and coarse broken stone-chips. Abundant water is to be given during the growing season and then gradually withheld. A kind admirably suited by the well-irrigated detritus of an artificial "moraine". Easily raised from seed.

R. aconitifolius (Pl. V). A strong, tall-growing herb, reaching at times to over three feet, and bearing a large panicle of white blooms. June-August: in cool pastures, or moist and partly shaded places over all Swiss mountains; 500-2000 m.

R. platanifolius is nearly related to *aconitifolius*, but differs in slenderer and almost smooth flower-scapes, in larger leaves, cut less deeply, but into narrower and more grass-like segments. Grows under the same conditions as its congener, but chooses drier situations and does not descend so low. Both are of easy culture and are most ornamental in rockeries, parks and wild gardens. A cool and lightly shaded position in the bog-garden is needed.

R. Thora. A curious plant with a fusiform root-stock, not unlike a miniature tuber of dahlia; stem slim, solid and smooth, bearing midway one or more sessile leaves, of which the lower is large, orbicular, coriaceous, strongly veined, serrate and broader than long; flower small, bright yellow, usually solitary. June-July. Mountainous regions of the limestone Alps and Jura; 1000-2000 m. Ancient warriors extracted from the juice with which the stem is charged a violent poison; with this they impregnated the points of their arrows and made them most deadly weapons.

R. montanus and *Villarsi* are small species with brilliant yellow flowers; the stem of the former is 2-6 in. long, the leaves glabrous, 5-partite; flowers 1-3 at the extremities of the branches; the second has a taller and more branched stem, many flowers and carpels with a curved or hooked beak. Cool and shrubby pastures in the Alps and Jura from 1000-2000 m.

All the three last species are readily cultivated in sound soil and a sunny position.

Trollius

Eng.: Globe-flower; Fr.: Trolle or Boule d'Or;

Ger.: Trollblume or Rollen.

T. europæus * (Pl. VI). A plant familiar to all wanderers on high ground, frequenting cool and moist meadows over all Switzerland, from the beginning of the mountain zone up to 2000 m. The flower, which never expands, may be compared to a yellow globe; it is delicately scented and composed of a varying number of coloured sepals; the petals are small, tubular organs, hidden at the base of the stamens, and serving as so many nectareous cells for the attraction of fertilising insects.

The globe-flower in varied forms and tints is found spread over all the northern hemisphere. It is met in the Caucasus, the Atlas, the Himalaya, in Siberia, Japan, China and America, with little difference of appearance, though known by different names. Ten variants, brought from different mountain ranges, are cultivated at Flor-aire; they have so freely modified by hybridisation, that it is impossible any longer to identify them under the definite species, and one is compelled to think that, certain American types excepted, they are all modifications caused by local influences of one and the same species.

In the Alps the root of the globe-flower has long been

used as a purgative. The Rev. H. Friend, in his delightful work on the mythology of flowers¹, says that the name Trollius comes to us from the Scandinavians, who held the god Troll to be an evil spirit. The somewhat poisonous elements of this plant being granted, he is of opinion that the ancient Swedes named it the "Devil-flower". It is a beautiful plant and does well under cultivation, with preference for somewhat cool, half-shaded positions and porous soil. If, however, the natural soil is dry, plenty of retentive stuff should be added. Plants should be divided in autumn. Grows readily from seed, flowering in two years.

Caltha

Eng.: Marsh Marigold; *Fr.*: Populage; *Ger.*: Dotterblume.

*Caltha palustris**§. This magnificent king-cup with large, expansive flowers of golden orange and hollow stems and broad leaves of cheerful green, grows on the edges of water in the alpine regions and sometimes descends to the plains. In spring the flowers form one of the richest ornaments of the mountain landscape.

Though the alpine *Caltha* has received the specific designation of *alpestris*, there does not appear to be any botanical difference between it and the species common in English meadows, so that it should perhaps not be regarded as an *alpine* in the true sease of the word. The single English form is too common to merit cultivation; the double one is, however, very fine and worthy.

Aquilegia

Eng.: Columbine; *Fr.*: Ancolie; *Ger.*: Akelei.

A genus clearly defined by regular flowers with 10 divisions, 5 broadly lanceolate, coloured sepals and 5

¹ *Flowers & Flower Lore*, Rev. H. Friend, vol. I. p. 57.

trumpet-shaped petals, prolonged into nectar-bearing spurs.

A. alpina (Pl. VII). Perhaps the most delicate and charming of alpine, with its slender leaves, finely divided into graceful leaflets, and its ample flowers, the sepals a glorious blue, the petals purest azure. It is necessary to insist that this is the typical form, on account of an obstinate superstition that the variety with white centre is the only true one. Flowers in July. Native of shady alpine slopes (1200-2000 m.).

Au flanc des verts ravins j'aime à voir l'Ancolie
A la robe d'azur cachant un anneau d'or,
Vivre comme perdue en sa mélancolie,
Poursuivant loin des bruits son éternel essor.

De sa fleur qui se penche humblement vers la terre
On ne voit que du bleu, le bleu foncé des cieux,
Mais du fond du calice où se cache un mystère
S'échappe un rayon d'or mille fois glorieux.

H. C.

This noble plant is not at all amenable to cultivation. A stony, well drained soil is necessary, and a cool, somewhat shaded situation. In England I have seen fine examples at Warley and elsewhere, even in Surrey. In the botanical garden of Linnæa, at Bourg-Saint-Pierre, it grows magnificently and reaches a considerable size, producing as many as thirty flowers on a stock. Perhaps the secret is that most die a natural death, the plant being a biennial, so that no care can avoid annual renewal from seed—a thing, fortunately, most easy to do. Certain it is that columbines are prodigious rooters, the stock, it may be, boring two feet down before emitting roots. The fact mentioned below—the habit of promiscuous hybridisation in gardens — is enough of warning to the wise to secure collected seed from wild plants. None other is safe. An autumn dressing of leafmould and gritty loam is beneficial.

*A. vulgaris**. This is the typical form both in lowlands and mountains. The flower is smaller than in *alpina*; the stem grows to two feet in height or even more, is much branched and bears at times large panicles of dark blue flowers with a centre of golden-yellow stamens. In the variety *atrata* the flowers are dark brown.

A. vulgaris takes many forms, and under cultivation hybridises readily with the columbines of the Old World, but never with the long-spurred species from North America. By crossing one obtains a multitude of different shapes and tints and types, which can be used with admirable results in the garden of an artist. At Floraire, where endeavour is made to harmonise the forms and the colours and to give a proper value to their loveliness by placing them in an appropriate and effective setting, we have seen lovers of the beautiful faint with delight at the sudden sight of the simple pictures which fair nature creates in our alpine garden. And, since columbines reproduce themselves spontaneously without the gardener's aid, wonderful combinations of colour and lovely effects are soon obtained in copses and shady corners, which strike pale with jealousy the coarse masses of bedded-out reds or yellows or pinks with which philistine gardeners of to-day have served us to satiety.

The columbine is important among the flowers of mythology. It was once the emblem of unhappy love and is so mentioned by Shakespeare in *Hamlet*. In "The Masque of Flowers" (Flora's Feast), by the celebrated designer Walter Crane, the graceful leaves form a chariot in which Venus rides, garlanded with the blossoms and drawn by two trains of five doves each: "Fair Columbines that drew the car of Venus from her distant star".

(Columbine is derived from *columba*, a dove. Cp. Bacon's expression "to join serpentine wisdom to columbine innocence". *Ed.*).

Actæa spicata *

Eng.: Baneberry or Herb Christopher; *Fr.*: Actée or Herbe à St. Christophe; *Ger.*: Christophskraut.

The peculiarity of this plant is that, alone among European *Ranunculaceæ*, it has a baccate fruit. It is a strong-growing plant, sometimes attaining a height of 2-2½ feet; stem hard and branched; leaves ample and resembling those of the *Reine des Bois* or *Spiræa*; flowers small, inconspicuous and whitish, in large, lax racemes, followed by beautiful spikes of glistening black berries. Grows in cool and shady mountain parts. Variety *alba* has white berries and red stalks.

The poisonous root is purgative and sometimes used in pharmaceutics in place of the black Hellebore.

May be grown in a cool and shady part of the rockery or garden, but the habit is too coarse and the flower too transient for a choice position. Seed germinates slowly.

Delphinium

Eng.: Larkspur; *Fr.*: Dauphinelle or Pied d'Alouette; *Ger.*: Rittersporn.

This genus is distinguished by an irregular calyx with 5 unequal, caducous, petaloid sepals, the dorsal one prolonged into a spur; 4 petals, of which the two dorsal ones are lengthened into appendages enclosed in the spur like a knife in a sheath.

The only Swiss alpine species¹ is a sturdy, herbaceous perennial, with pubescent stems, bearing downy leaves, more than 40 in. high and terminated by a long spike of dark-blue flowers. July-September. Native of stony and cool pastures in the calcareous Alps. Easily cultivated in partial shade.

¹ (*D. elatum*. Ed.).

Aconitum

Eng.: Monkshood; *Fr.*: Aconit, Char de Vénus; *Ger.*: Eisenhut.

Flower with irregular calyx; 5 petaloid sepals, the dorsal erect and bent over into the shape of a Phrygian cap which covers the corolla; petals very irregular, 2-6 in number, the two upper, which form rich nectaries of honey, suggesting two tritons yoked to a car.

*A. napellus** (Pl. VIII). Stem simple, erect, sometimes branched towards the summit; leaves palmate, smooth, dark green; flowers indigo-violet blue, in close, long and upright racemes. June-October. Rocky and bushy pastures of the Alps and Jura.

A. paniculatum differs in the fully branched character of the stem, in deeply toothed leaves and hooded crescent-shaped flowers in short racemes gathered into a panicle. August-September. Rocky and shady parts of the Alps; 1200-2000 m.

A. Lycoctonum (Pl. IX). A tall, stout plant with spreading branches; leaves palmate, 5-7-lobate; flowers, of which the hood is lengthened and slightly constricted at the middle, ochreous-yellow, in terminal racemes. July-August. Woody mountains districts.

A. anthora. Distinguished by a shorter, stiffer and more erect stem, with the leaves finely divided into thin, ligulate segments; by larger flowers of greenish-yellow in one close raceme or several racemes forming a compact panicle. August-October. Stony place pastures of the southern Jura; 900-1400 m.

Culture: all the aconites succeed in a cool soil, partially or wholly shaded; the variety *anthora* alone requires sun.

All species, more particularly *napellus*, are moist poisonous and dangerous to cattle, which, one must add, do not touch them in a growing state, and eat them when dry with impunity. The root-stocks, which are generally turnip-shaped or fusiform, are charged with juices containing aconitine, a poisonous substance much used in medicine, and more especially in homœopathy.



Papaveraceæ



This order consists of annual or perennial herbs containing a milky juice; the alternate leaves are usually incised or divided into lobes, the flowers are regular and carried at the ends of the stems with a calyx of two, or sometimes three concave, transient sepals and a corolla of four, or rarely eight to twelve, smooth deciduous petals, crumpled in the unexpanded bud; stamens very numerous; the fruit is either an ovoid capsule, crowned by the stigmas, or a pod not unlike those found in Cruciferæ.

Papaver

Eng.: Poppy; Fr.: Pavot; Ger.: Mohn.

P. alpinum (Pl. X). A delicate and charming little rock-plant, forming tiny tufts of crowded, short branches, breaking at the extremities into bluish-green leaves, more or less finely cut and divided; each of the numerous, slim, drooping foot-stalks ($1\frac{1}{2}$ -6 in. high) bears a large solitary flower with four waved petals, snow-white in colour and shimmering like silk; they are delicately scented. This somewhat rare plant is found (1200-3000 m.) among rocks and fissures of the limestone. *P. rhæticum* from the granitic eastern Alps is almost identical, except for big, pale saffron flowers. May-September.

In cultivation it is one of the most delightful alpinæ, exacting nothing but a poor, pebbly soil, and a cool position but exposed to the sun. Moisture around the collar is apt to kill it in English winters, but fortunately it germinates readily from seed which may be scattered where it is intended to flower. Many variations of shape and tint

have been produced — delicate rose, pale yellow, bright orange, brick-red with all intermediate shades.

Petit pavot des monts qui fleuris sur la pente
 Au sein des blocs épars,
 Bravant les froids autans, la neige, la tourmente
 Et les sombres brouillards,
 J'aime à voir, au matin, briller fraîche et joyeuse
 Ta fleur d'or et d'argent,
 A la voir frissonner sur l'arête neigeuse
 Et sous les coups du vent.
 Est-il vrai que ta coupe, au fond de son calice,
 Cache un secret venin,
 Que ton parfum produit une ivresse factice,
 Mauvaise au genre humain?
 Est-il vrai que ta fleur, perfide enchanteresse,
 Contient dans son encens
 Un narcotique obscur qui sait, avec adresse,
 Engourdir tous nos sens?
 Quoi? Ton cœur cacherait un malfaisant génie
 Couvert par tes appas?
 Allons! je ne veux pas croire à la calomnie:
 Ta beauté ne ment pas. H. C.

A closely allied species comes to us from Siberia and the arctic regions, *P. nudicaule*, which has naturalised itself in the immediate neighbourhood of the botanical gardens of Linnæa at Bourg-Saint-Pierre, and of Rambertia at the Rochers de Naye. The seeds were sent to us either by the traveller Bonvalot from Central Asia or by friends of these two gardens from the far North. The flowers have been crossed with *P. alpinum* and given rise to an infinite number of wonderful hues and shades. It has been introduced to the public by our garden of acclimatisation at Floraire and has become a most popular garden flower, during the last few years.

Cruciferæ



The prosaic order *par excellence*, whose interest lies in the kitchen and economic gardens, giving us cabbages, turnips, horse-radish, colza, cress and mustard, whose valuable antiscorbutic properties scientists may analyse into an acrid, stimulating and sulphureous principle. The botanist's analysis runs: annual or perennial herbs; leaves alternate; flowers regular, with a calyx of four sepals and a corolla of four petals arranged alternately with the sepals in a maltese cross and attached by long claws; six stamens, tetradynamous (an alarming word, signifying four long, and two short); style simple, with two adherent stigmas. The flower-gardener will pass the order by, as containing little of merit, and even of the more select species the Alps contain few worthy except one or two *Drabas*, *Erysimums*, *Hutchinsia* and, perhaps, *Dentaria* or *Thlaspi rotundifolium*. For example, no ordinary garden can accomodate other *Arabis* than the Greek *pallida*.

Draba

Eng.: Whitlowgrass; *Fr.*: Drave; *Ger.*: Hungerblume.

A genus composed of pretty, little rock-plants, of dwarf and compact habit, and genuine children of the snows. Too small to hold their own except among the tiniest of companions, they are interesting without being striking, and worthy of trial in mossy walls, the species with yellow flowers making a gay show. The best are perhaps *aizoides* and *pyrenaica*, though the second is inclined to damp off, unless regularly topdressed with *clean* grit. Otherwise

they are of easy culture in dry, sunny, open spots. All are easily raised from seed or increased by division. They are distinguished by the generally entire and simple leaves, which are either fringed or covered with hairs; the sepals are erect and equal; the petals entire, emarginate or bi-fid, and the fruit contained in an oval silicule, the seeds being without wings. The chief alpine species are:

*D. aizoides** (Pl. XI). A dwarf, tufted plant, which linear leaves, the edges markedly ciliate, clustering into compact rosettes; flowers vivid yellow, in short racemes on a leafless and smooth scape. March-July. Rocks of the Alps and Jura (500-2000 m.).

D. affinis, differing by a larger flower and fruits $\frac{7}{16}$ in. long ($\frac{3}{16}$ - $\frac{5}{16}$ in. in *aizoides*). High Alps.

D. Hoppeana, with leaves ciliate or fringed, something like a fish-bone; flowers yellow, in a thin, slender raceme. From the granitic Alps (2200-2500 m.).

D. tomentosa. A dwarf plant with small, cottony leaves in a close rosette springing from the old withered ones; flowers white; July-August. High Alps, in fissures of limestone.

D. frigida, to be known by its smooth, oblong fruits (oval and ciliate in *tomentosa*), by somewhat smaller and less white leaves. July-August. High Alps, in crevices of granitic rock.

D. pyrenaica (*Petrocallis pyrenaica*) (Pl. XI). A small plant, forming dense tufts of innumerable rosettes of leathery, glistening, cuneate leaves, strongly veined and terminated at the apex by three well marked teeth. The tight, compact, green cushion looks, when out of flower, like a saxifrage. The lilac flowers are borne in small bunches on a short stem (often non-existent). July-August: in the detritus of fissures of limestone (2000-2500 m.) something of a "miff", requiring sandy loam on level sunny rocks, and regular top-dressing.

Kenera

K. saxatilis (*Cochlearia sax.*). A small tufted rock-plant; leaves longish ovals, hairy, with or without toothed edges, and gathered into large rosettes; stem slender, branching in the upper part, and bearing a variable number of small, pure white flowers, arranged in panicles. June-August. Limestone crevices.

At home in cracks of rocks or old walls, or any open position. Easily raised from seeds, but hardly deserving a place in gardens.

Vesicaria

Fr.: Vésicaire.

V. utriculata: A rock plant, somewhat sub-shrubby in appearance with short branches, terminated by tufts of oblong leaves, covered with a flat-lying pile which thin out into long petioles and form broad rosettes; flowers large, of pale yellow, in an erect raceme, and followed by swollen globular fruits. May-June. Fissures of limestone in the lower Valais. A plant of some merit but inferior to *græca*. Both best raised from the seeds, which are prodigally produced and easily grown in old walls, limestone chips and any sunny dry place.

Erysimum

Eng.: Hedge-mustard; *Fr.*: Velar; *Ger.*: Hederich.

A genus containing perennials, biennials and annuals, among which *E. ochroleucum* and *pumilum* are pretty, ornamental plants suited for rockeries, borders and edgings in formal gardens. Both do well in dry sunny positions, *pumilum* especially requiring very gritty loam and abundance of dry stone chips. Its delicate prettiness deserves a choice

corner, whereas *ochroleucum* is apt to spread rank and to become a nuisance with self-sown seedlings; it should also be frequently divided.

E. ochroleucum (Pl. XI) is a sort of little, tufted, grassy ten-week-stock, whose ascending branches (4-12 in. long) are terminated sometimes by a bunch of green, hairy, narrow, oblong leaves, sometimes by a stem carrying a cluster of very sweet flowers, a beautiful shade of yellow. May-June. Only found in rock rubbish of the Jura, from the Chasseral to la Dôle. *E. pumilum* is a low-growing form (1 in. high) with narrow, fewer, less-toothed and generally less vigorous leaves but does not otherwise differ much from *ochroleucum*. *E. helveticum* also is very similar. Both the latter are confined to the Alps.

Dr Hermary of Tours (*Gazette Médicale du Centre*) calls attention to the excellence of *Erysimum* as a remedy for simple cases of laryngitis, and mentions that it was once much used for this purpose. A great mistake has been made in forgetting this, for nothing better can be used.

Dentaria

Eng.: Toothwort; *Fr.*: Dentaire; *Ger.*: Zahnkraut.

Flowers and leaves large; sepals erect; stigma entire or slightly scalloped; pod hard, bulky, lanceo-linear, the flat valves opening elastically and rolling from below upwards on the ripening of the seed.

D. digitata. A plant 12-20 in. high, with a dentated and articulated subterranean stock; leaves 5-foliate, digitate, palmate, large, with a strong taste of cress; flowers large, lilac-violet, in drooping terminal racemes. Mountainous and woody districts of the limestone Alps and Jura.

D. pinnata (Pl. XII) is distinguished by pinnate, instead of digitate leaves, with 5-7 leaflets arranged along the

petiole like the webs of a feather; flowers pale lilac or whitish. Same districts as preceding.

It requires light sandy peat with plenty of leaf mould, and a cool situation under moderate shade. Propagated from seed or, with ease, from root-division.

Hugueninia

H. tanacetifolia: a plant from 20 to 40 in. high, with greyish leaves very deeply divided into delicately incised and dentate leaflets; stem erect, branched at the top, with very many leaves; flowers small, pleasant yellow, slightly scented, in large panicles. July-August. Cool and shady parts of the valleys of Arolla and Bagnes, from 1800 to 2200 m. The plant somewhat suggests a yellow Valerian and is one of the few Cruciferæ that delight in moisture. In some damp out-of-the-way corner a place may be found for it.

Cardamine

C. resedifolia. A small turf-like herb, 2-6 in. high., radical leaves rounded and oblong, stem-leaves deeply pinnatisect, with 2-3 pair of blunted linear leaflets; the flowers small, white, in erect spikes. July-August. High Alps. *C. alpina*, from similar habitats, differs in that the leaves are either undivided or exhibit three indistinct lobes. Neither however is really equal to the native "Cuckoo-flower" *C. pratensis* fl. pl.

Arabis

Eng.: Rockcress; *Fr.*: Arabette; *Ger.*: Gänsekresse.

Flowers white, rose, violet or bluish, with erect, equal sepals, and stigma entire or slightly scalloped; siliquas (pods) narrow, linear and compressed. Although the

alpine varieties are pretty things for associating with *Alyssum*, *Aubrietias* and early spring flowers, none is really worth cultivation by the side of the Greek *A. albida*, especially in its new double form, whose only fault is its irrestrainable rampancy.

A. alpina (Corbeille d'argent) (Pl. XIII). A tufted herb, with many creeping, diffuse branches; leaves greyish, coarsely toothed; flowers pure white, numerous, on lengthy spikes. April-August in cool and rocky parts of the limestone formation (500-1500 m.).

A. arenosa: a biennial, not forming a sward, with slender, erect, branching stem; radical leaves deeply pinnatifid; rose or violet flowers, fairly large. May-September in rocky and cool positions of the north and central Jura.

A. bellidifolia (Pl. XIII). Tufted plant; leaves glossy, oblong-oval, entire or dentate; flowers milk-white, numerous, grouped in a stiff panicle. June-July. Moist places in the Alps from 1000 to 2000 m. Will grow in cool parts of the rockery.

A. pumila differs from it in hairy leaves, and a much more squat habit. Native of the Alps (2500-3000 m.).

A. cærulea differs from *bellidifolia* in a stem hardly exceeding 4 in.; radical leaves terminated by three teeth; small flowers with bluish, caducous petals. July-August among the stones in the high Alps (2400-3000 m.).

Matthiola

*M. valesiaca**: A small stock with violet flowers in erect spikes; grows on warm slopes along the Simplon road and in the Binnthal.

Hutchinsia

H. alpina (Pl. XIV): a small tufted herb, forming a close sward; foliage smooth, of a dark, glossy green, the leaves

rosulate or arranged along the stem, composed of small, oblong, entire leaflets; stems slender, bearing tiny, pure white flowers on erect and crowded spikes. June-July. Cool rocks in the limestone Alps and Jura, between 1000 and 2700 m.

Culture: cool rockery, with partial shade, if possible. It is altogether a delightful little carpenter, but spreads dreadfully, when established, from seed.

Thlaspi

Eng.: Bastard Cress; *Fr.*: Tabouret; *Ger.*: Täschelkraut,

T. rotundifolium (Pl. XIV). A neat, little creeping plant, sufficiently meritorious for exhaustive collections, with smooth, fleshy leaves, rounded ovals in shape and gathered into rosettes. The flowers are reddish-violet, sweet-scented, growing in dense, flattened racemes. June-August. Limestone Alps. Requires full sun and a crevice in a wall or chalk rock. Easily grown from seed.

Biscutella

Eng.: Buckler Mustard; *Fr.*: Biscutelle; *Ger.*: Brillenkraut.

B. lævigata: a plant with rough leaves, the edges coarsely dentate, which insensibly narrow on the leaf-stalk; flowers numerous, small, clear-yellow, in a spreading raceme on the apex of a slender, brittle stem; the fruit is very suggestive of a pair of lunettes with a peak between the two halves. July-September. Rocky pastures of the Alps (1000-2000 m.).

A plant of some claims, but very seldom seen in gardens. It requires light deep soil, full sun, in rockery or open beds. Propagate by seeds.



Cistineæ



This order is composed of small sub-shrubs, of which the leaves are usually opposite and undivided, the flowers, not unlike small wild roses, regular with five sepals (the two exterior being smaller) and five transient petals, which usually fall before evening. The stamens vary in number. For garden purposes it is represented by the genus *Helianthemum*, with similar characteristics.

Helianthemum

Eng.: Rockrose; *Fr.*: Hélianthème; *Ger.*: Sonnenröschen.

We have no more ornamental or useful plants for rockeries or dry, sunny banks. They may be employed as edgings or carpets, for the decoration of walls, rocks or shrubbery borders, and ask for no attention beyond a lightish soil and open situation, while their hardiness is beyond all question, neither heat nor drought preventing them from flowering throughout the length of summer up to the autumn frosts. All varieties should be cut back after the first period of bloom to ensure new breaks, compact growth and a second bloom. They are raised with the greatest ease from seed. The common sunrose breaks into glorious varieties of colour — rose, red, carmine, vermilion, crimson, white, yellow, both single or double. From it originate most of the listed kinds, which are in themselves sufficient to furnish a garden with representatives of the genus.

*H. vulgare** (Pl. XV). Small, shrubby; erect branches, drooping at top; leaves oblong-ovate, green on the upper

and greyish on the under surface; the stems terminated by long, narrow racemes of vivid yellow flowers, succeeded by large, swollen capsular fruits. May-October over all sunny slopes of our mountain regions.

H. grandiflorum is distinguished by very large flowers and leaves green on both surfaces; *H. alpestre* (Pl. XV) by leaves green below and covered with hairs on the mid-rib and petiole.

H. canum * is a well marked species, with narrow, ovate leaves, hoary and covered with hairs, especially on the under side; flowers small, yellow, united in short racemes. June-August. Rocky slopes of the Jura and the Salève (beyond the frontier).

H. Fumana. Dwarf and slender shrub, with branches either erect or procumbent; leaves alternate and sharpened like short needles; flowers yellow, only opening in the sun and whose petals fall at the least shock. June-September. Dry slopes of south and west Switzerland.

Violaceæ



Herbs with leaves most frequently alternate, flowers irregular, the peduncles furnished with two bracts; 5 free sepals; 5 petals, free or slightly coherent (the lower enlarged and apron-shaped) prolonged behind in a spur of varying size; 5 stamens with very short filaments.

Viola

Eng. : Violet or Pansy ; *Fr.* : Violette or Pensée ;

Ger. : Veilchen or Stiefmütterchen.

Roughly speaking Violets are the smaller flowered, Pansies the larger flowered species of this genus. For alpine gardens the best varieties are *calcarata*, *biflora*, and a newly introduced American *pedata*; *cenisia* is as awkward as *calcarata* is obliging. With this one exception they are of the easiest culture and propagated by seed, division after flowering, or cuttings from short, soft runners. The florist's "pansy" is derived from *altaica*, and the garden "viola" from crosses of these "pansies" and alpine violas. It is useful to note that non-yellow-flowered species are less impatient of dry positions than those with yellow flowers.

V. calcarata (Pl. XVI). Plant of turf-like habit, oblong-ovate leaves, with roundish notches on the edge; flower very large, dark violet, with a slender spur as long as the corolla projecting behind; sweet and pleasantly scented. It may occasionally be met in a variety of colours, especially on the Italian side of the Alps, from exceedingly

deep violet to pure white or yellow. June-August. Alps and southern Jura in pastures from 1000 to 2500 m.

Culture: this charming plant may be grown in a soil composed of equal parts of leaf-mould, sand and good loam; a cool position, but on no account complete shade.

Usages: the flower, gathered at the time of opening and dried in shade is much valued by our highlanders, who employ an infusion of them against affections of the throat and catarrh.

V. cenisia (Pl. XVII) is a species near akin, but with subterranean stems which thrust long, winding stolons among the stones. The leaves are longer, thicker, hardly at all notched; the corolla is a trifle smaller and of bluer-violet shade. July-August. Detritus of calcareous Alps from 1500 to 2500 m.

Culture difficult: requires a well-drained niche in the rockery and sun.

V. heterophylla (Pl. XVII) is a plant with slender, erect, branched stems; leaves of different sizes and shapes; flowers of medium size and reddish-violet. June-September in the south-east Alps, and has acclimatised itself in Valais, both in the neighbourhood of the botanical garden of Linnæa and on the Rochers de Naye below Rambertia.

V. biflora (Pl. XVII). Slender, short plant, with blunted, reniform leaves, of a clear green, flowers small, bright yellow, streaked with violet, scentless, arranged in pairs on an erect stem, which bears one or more leaves. June-August. Moist, shady and cool spots in the Alps and Jura, particularly at the base of rocks.

Culture: this delightful, yellow-flowered violet may be grown in a cool, spongy, sandy soil (leaf-mould and sand), on the rockery or at the foot of a north wall, or even in shaded gravel.

V. palustris *. A small plant with leaves of a clear green, rounded, and with slightly toothed edges; flowers small, clear lilac, scentless; the lower petal veined, with a short, thick spur. May-July. Mountain marshland, where the tiny flowers may be seen rising in the peat and among the moss.

V. Thomasiana. Leaves oblong-ovate, somewhat heart-shaped at the base, pubescent; flowers large, red-violet and very fragrant. May-September. Rocky slopes of the Alps (1000-2000 m.) under stones or among rocks.



Polygalæ



Herbaceous plants or shrubs, with alternate, simple, entire leaves, the irregular flowers either solitary or united into spikes or racemes; a paniced inflorescence is rare. The calyx consists of 4-5 sepals, of which the larger are wing-like and coloured (petaloid); the corolla of 3-5 petals, the anterior shaped like a keel, which encloses the reproductive organs; there are eight stamens, in groups of four. The characteristics of the typical genus are identical.

Polygala

Eng.: Milkwort; *Fr.*: Polygale; *Ger.*: Kreuzblume.

P. chamæbuxus (Pl. XVIII), or "Faux buis", is a small, diminutive shrub with branched and prostrate stems, partly buried in the ground, bearing a great number of branches furnished, in the upper part, with thick, oblong-ovate leaves, persistent through winter; flowers large, pale yellow at the external divisions, darker in the centre and turning at the apex to a red-brown after fertilisation. Flowers through the winter in sheltered places. February-May. On January 20, 1906, I found a plant in flower on a rock facing the south at the height of 2100 m., above the Thyon Alp, in Val d'Héremence, Valais. In Canton Ticino and among the hills of Lombardy, the exterior of the flower is of a bright carmine, which contrasts happily with the vivid yellow of the centre. Grows in wooded slopes and in sub-alpine regions; is also met in some few parts of the Jura.

It requires a porous, well drained chalk soil, under partial shade. In sandy peat and loam English specimens are found to surpass the alpine type. Beautiful examples are to be seen at Friar Park, where it is used for borders and carpet-work and flowers prodigally.

P. alpestris (Pl. XVIII). "Herbe au laitier": an annual species with very slender, thread-like stems, with sparse leaves, those springing from the root being short and obovate in shape, those on the stalk being oblong and lance-like. It bears a spike of 10-20 blue flowers, the wings (sepals) traversed by veins which branch towards their end. June-July. Pastures of the Alps and Jura.

The milkwort root has an exceedingly bitter taste, and is used for lung troubles, especially chronic bronchitis, and as a purgative.

Caryophyllæ



The plants included in this order are mostly herbaceous, and are distinguished by angular or cylindrical and often articulated stems; the leaves are opposite, simple and entire; the inflorescence is definite, i. e. opening first at the apex and last at the base; flowers are solitary, often in fascicles or bundles; the sepals, 4-5 in number, may be either separate or connate; the petals, 4-5, are only attached at the base of a claw of varying length, and the edges may be entire or more or less divided; the stamens, 5-10, are arranged in two whorls.

Dianthus

Eng. : Pink; Fr. : Œillet; Ger. : Nelke.

There is, perhaps, no genus of alpine plants, upon the cultivation of which opinion is more variable — from a comprehensive “exceedingly easy” to Mr. Farrer’s summary dismissal: “the Pinks are a difficult race”, or his specific outbreak upon *D. sylvestris*: “the coralline loveliness of this evil-tempered and most ungrateful of plants”. The truth seems to be that, whereas the taller kinds (e. g. *superbus*), except *D. Carthusianorum*, often affect dampish and partly shaded spots, the smaller tufted species come, as a rule, from open, sunny, high pastures which might almost be called arid and baked, yet this preference for dryness is due not to dislike of seasonable moisture but to dislike of heavy, retentive soil. Most will die out in borders and should be wedged among

sloping stones or packed between upright slabs, should be regularly top-dressed, to prevent a leggy habit, with grit, sand and leaf-mould, and in winter protected round the collar by abundant chips of the stone congenial to them. Few will venture to attempt the removal of full grown plants from the Alps, after once wrestling with the deep tap-roots so characteristic of the genus. Fortunately all seed is easy to raise and quick to germinate, so that it wise to keep a regular supply of seedlings, especially as some, e. g. *superbus*, are perhaps really biennials.

The characteristics of the genus are as follows: calyx five-toothed, with a calyculc or scale-like organs at the base; five petals with long claws; ten stamens; two filiform styles. The chief species and their habitats are:

D. Carthusianorum (Pl. XIX). Carthusian Pink; Œillet des Chartreux; Karthäuser Nelke. Stems erect, simple; leaves narrow, acuminate, opposite, sometimes a bluish-green; flowers more or less vivid carmine red, small, united in a terminal cluster of 2-30 scentless flowers, on a very short and almost non-existent peduncle. June-September. Meadows and dry slopes of all our mountain districts.

D. atrorubens is distinguished by its tall, slender stem, smaller and narrower petals, and more elongated flowers. Native of sunny places in Valais and Ticino.

Culture: both do well in gardens and rockeries exposed to the sun; in such positions they flower profusely and for a long time.

D. sylvestris. Stems simple or slightly branched; leaves long and narrow, like pine-needles, dense, numerous, forming a close tuft; flowers solitary, of a beautiful clear rose colour, the petals notched and not bearded. June-October. Hills and rocks of the Alps and southern Jura.

(500-1800 m.); the origin of the "sylvan" misnomer is mysterious.

This charming plant is quite successful in Swiss gardens, on a rockery, on dry, arid slopes and in the border. It requires full sun and a soil of stone chips. A white-flowered variety is cultivated at Floraire.

*D. cæsius** (Cheddar Pink) is a small grass-like plant, with a running root-stock, bluish green in colour, and forming large low, flat tufts; stems bearing one large flower of pale rose, with bearded, dentate petals; fragrant. July-August. Dry pastures and rocks of limestone Alps and the Jura, but sporadic. (1000-1800 m.).

Culture: full sun in a gritty chalk rockery, or mossy chink of walls. Unsited to the heavier soil of an ordinary border.

D. glacialis. A miniature species, with long wiry leaves of shining dark green, forming a tuft in whose midst are hidden flowers of medium size, scentless, of most brilliant carmine-red colour, rising on stems so short that they are overtopped by the leaves. July-August. Granitic Alps of the Grisons from 1900 to 2500 m.

It is a capricious species in cultivation, being generally considered the most difficult to grow, and yet occasionally rampant in almost pure sand. It is a lover of moisture if not stagnant. To be planted in a well drained niche of granite, with a porous soil of leaf-mould, granite sand, loam and peat; lime be must avoided. A regular top-dressing of *coarse* grit must be given in autumn, and sandy gritty loam worked among the young plants during the year from time to time.

D. superbus (Pl. XIX). Stems upright or drooping, branching above; lanceolate leaves of dark green; large flowers of violet-lilac, with long petals deeply cut and fringed, spotted green at the base; perfume delicate and

penetrating. August-October. Woods, copses and glades in all our mountain districts. The variety *speciosa*, whose flowers though larger and more richly coloured are fewer in number and have less deeply cut petals, is found here and there in alpine meadows.

Culture: a splendid plant for half-shaded edges round groups of trees.

D. monspessulanus differs from the preceeding in its narrower leaves, stiff thin stems, generally single-flowered, and not exceeding twelve inches in height; in its smaller flowers with petals of clear rose, not spotted, edged with a simple fringe, and hardly divided. July-October. Rocky pastures and thickets of the Ticino Alps and the southern Jura (beyond the frontier).

Culture: open beds or rockery; in sun.

Tunica

T. saxifraga. This is a small plant with very numerous, erect, thin and branched stems, forming a tuft almost destitute of leaves, but producing an infinite number of tender-rose flowers, very similar to those of *Gypsophila repens*, cymosely arranged above the plant; leaves narrow and like short needles. June-October. Dry and arid spots in southern Switzerland. It should be grown in the poorest of soil, for it is so prodigal of bloom till late in autumn that it is otherwise apt to flower itself to death. A good grit dressing is necessary to protect it against winter damp.

Gypsophila

Eng.: Gypsophila; *Fr.*: Gypsophile; *Ger.*: Gypskraut.

G. repens (Pl. XX). A small glabrous plant, with fairly long, procumbent, pendulous branches. The leaves are narrow, oblong and glaucous; the innumerable flowers,

carried aloft in spreading racemes, cast a rosy-white mist over the succulent mat of foliage. June-September. Rocky limestone slopes of the Alps and southern Jura, from the foothills upwards. It, like others of the genus, is an indispensable plant for carpeting rocky banks, edges of borders or old walls. It never looks better than when drooping over shelves of limestone. Of the easiest culture in full sun and well drained light soil, containing plenty of grit and sand. Multiplied by suckers, cuttings or seed.

Saponaria

Eng.: Rock soapwort; *Fr.*: Saponaire; *Ger.*: Seifenkraut.

S. ocymoides (Pl. XX). A spreading plant with numerous, long, winding, prostrate stems, straggling over the ground and in some cases attaining a yard in length, leaves ovate-lanceolate, the upper ones acuminate; flowers very numerous, small, of a beautiful bright rose, in loose, spreading cymes. April-June. Dry places, especially on the chalk, in the Alps and Jura, up to 2000 m.

Culture: one of the most useful plant for decorating rocks, dry banks, borders and old walls. It requires full sun, and should be cut back in spring. Best in poorish soil — gritty loam and sand. Easily raised from seed.

Silene

Eng.: Catchfly; *Fr.*: Silène; *Ger.*: Leimkraut.

A delightful genus contained many indispensable plants. Although it is almost invidious to make a choice, perhaps the best of those mentioned below are *acaulis*, *bryoides* (especially the double form), *quadrifida* of the loose panicles, and *saxifraga*. But even better are *S. Elizabethæ* and *Pumilio*; these and the Caucasian *S. Schafta* should be in every collection. All like well drained, gritty soil; if overfed they are apt to run to a lot of soft growth,

which is easily attacked and injured by frost. Propagate by cuttings and seed.

The genus is distinguished by a five-toothed calyx, long-clawed petals, three styles, and a six-valved capsule which opens at the top.

*S. acaulis** (Pl. XXI). (Cushion Pink). A close-packed, cæspitose clump, forming a cushion of green, composed of innumerable branches crowded one upon another, and terminated at an equal height by rosettes of tiny, narrow, linear-subulate leaves, ciliate at the base, and bearing at the summit flowers of a charming rose colour, with 5 petals slightly crenated, and attached to the cushion in such a way as to cover it almost completely, so well indeed that the foliage cannot be seen through the shining garment above. The stalk on which the flowers is carried is very short, from $\frac{1}{2}$ to 2 in. July-August. Rocks, moraines, and dry pastures of the Alps (1500-3000 m.). There are several varieties, of which one, *S. exscapa*, has a small, sessile flower, directly attached to the branch, and an almost globular seed-vessel, which does not stand above the divisions of the calyx (in *acaulis* the capsule is oblong and exserted). *S. bryoides* differs from *acaulis* in non-crenate petals and a somewhat shorter capsule. All three forms are found with white flowers, and I have found on the Cenisian Alps a fine variety of *acaulis* with double flowers, like to miniature roses of the most beautiful vivid carmine.

Culture: the various cushion-pinks grow in a sunny position, a dry, sandy, well-drained, stony soil, with preference for a rockery or old wall.

S. alpina is closely allied to the common *S. inflata** of our fields, but the stems are prostrate and stoloniferous, the leaves very smooth, and the flowers larger. Found among stones.

S. rupestris (Pl. XXI). A slender plant with many, thin stems, divided and branching from the base; leaves nar-

row, lanceolate, of a bluish green, bearing a mass or white flowers, the petals entire or a little crenate. June-September. Rocky districts of the granitic Alps between 1000 and 2000 m.

S. quadrifida. Tufty, grass-like plant, with numerous, spreading, slender stems, furnished with bright green leaves, narrow and lanceolate; flowers small, numerous, of the purest white, with 4-toothed petals. July-September. Cool, shady limestone rocks in the Alps and Jura. Succeeds in shady crevices of the rockery or old walls.

S. saxifraga. A grassy plant, with slender stems, narrow, dark green leaves, detached flowers, borne 2-3 on long peduncles, a corolla only opening at night, the divisions being curled by day, white within and reddish-brown outside. July-September. Sunny rocks in the Alps (1000-1800 m.).

Lychnis

Eng.: Campion; Fr.: Lychnide; Ger.: Lichtnelke.

Although the species included in the genus are somewhat coarse and flaunting, yet the brilliance of colouring makes them very ornamental and striking in a garish fashion for a less select corner in the rockery or border. *L. Viscaria splendens plena* is of so dominant magnificence that it will kill any of the more delicate shades of red and therefore calls for discretion in planting. The native *alpina* is interesting without brilliance. The Japanese *haageana*, with many beautiful hybrids, and the Spanish *Legasæ* should not be omitted. Many grow readily from self-sown seeds — another reason for cautious handling. All are robust in constitution and do well, without much attention, in light soil, exposed to the sun.

Characteristics: Calyx with five teeth; petals on very long claws; five styles; the fruit capsular, opening by five valves or ten teeth.

L. sylvestris (*Silene diurna*, *Melandrium diurnum*) (Pl. XXII). A tallish plant, downy, with stems at first prostrate, then ascending; leaves ovate, large and soft; flowers of a purple-rose, in loose, spreading cyme; calyx coloured, swollen and hairy. June-August. Cool meadows of the Alps and Jura.

*L. viscaria** (*Viscaria vulgaris*) (Pl. XXIII). Stems erect, stiff, viscid; leaves narrow, oblong-lanceolate; flowers brilliant carmine, with connate petals, forming a lengthened, terminal cyme. Pastures of granitic Alps, from 800 to 1500 m. There is a variety with pure white flowers and another with double flowers.

*L. alpina** is a small plant, a diminutive species of the preceeding; stem 2-6 in.; leaves linear, ovate, of a green slightly tinged with blue, arranged in rosettes at the base; flowers small, numerous, vivid carmine, with petals deeply bi-fid and united in small, compact cymes. July-August. Granitic Alps in the dry pastures of the alpine zone.

L. Flos-Jovis (Pl. XXIII). Hairy plant, with erect stems, and large, lanceolate, cottony leaves; flowers of a clear carmine, arranged in flat bunches. July-August. Rocky and sunny pastures of the Alps (1000-1500 m.). A beautiful, white-flowered variety is found in the Turtmanthal.

Mœhringia

The sepals and petals vary from 4-5, with twice as many stamens; two or three styles; fruit capsular, ovoid in shape, containing small glossy black seeds.

M. muscosa (Pl. XXIV). Small, slender, mossy plant, with innumerable, spreading stems, furnished with little, narrow, filiform leaves, of clear green; flowers small, pure white, numerous, with four cruciform petals. May-September. Moist, shady places in limestone. Excellent for planting in cool parts of chalky rock-ward or old walls.

M. polygonoides is more dwarf, with broader leaves, and flowers five-petalled. Grows in detritus on the Alps, between 1000 and 1500 m.

Arenaria

The genera *Arenaria* (Sandwort), *Alsine* (Stichwort), *Sagina* (Pearlwort), which are closely connected together, are small, tufty plants, usually with fine leaves and white flowers, most of which have 5 sepals and petals, though some species of *Sagina* have only 4. The English species once known as *Mæhringia trinervis* is now included under *Arenaria*. There are in all about twenty alpine species included in these genera; they are found in rocks, débris, old walls, or sunny pastures of the Alps and Jura. Akin to *Mæhringia*, they are similar in appearance but usually grow in drier, sunny places. But for good garden kinds we must go outside the Alps, e. q. to *A. norvegica*, *bale-arica*, *gothica*, *purpurescens*, *montana*.

Cerastium

Eng.: Chickweed; Fr.: Céraiste; Ger.: Hornkraut.

Sepals five; petals five, bifid; stamens ten, rarely five; fruit capsule opens by ten teeth.

C. arvense (Pl. XXIV). Stems at the base procumbent, then ascendent; leaves ovate; sepals broadly membranous; white petals, slightly longer than the calyx. Fields, roadsides, from 500 to 1500 m.

C. glaciale (Pl. XXV). Tufty and running plant, with many stems, furnished with oblong, greyish leaves; flowers large, white, with spreading petals twice as long as the calyx. August-September. Stones and glacier moraines (1900-2000 m.).

Lineæ



Herbaceous plants with simple leaves; flowers regular, with five persistent sepals, five petals, five stamens, five styles and a superior ovary only attached at the base.

Linum

Eng.: Flax; Fr.: Lin; Ger.: Leinkraut.

L. alpinum (Pl. XXV). Stems divided toward the top, bearing many, narrow leaves; widely separated flowers along and at the apex of the branches, in a very loose cyme, the corolla large, of a lilac-blue. June-August. Meadows in the Alps and Jura.

L. tenuifolium differs in its shorter and slenderer stems, longer and narrower leaves, roughened on the edges, and, above all, by the lilac-rose tint of its fugacious corollas. Grows on the warm and sunniest slopes among the foothills.

All the flaxes are of marked elegance and light, feathery growth. Both the alpinæ, however, though useful rockery plants, are inferior to the garden varieties known as *flavum* and *narbonense*, with which and *perenne* and *sibericum* any ordinary collection may be satisfied. All enjoy full sun and flower from June to winter without attention. Easily multiplied by cuttings or seed.



Geraniaceæ



The majority of plants included are herbaceous; at the base of the leaves will be found the small leaf-like organs known as "stipules"; the flower is composed of five petals, five sepals, ten stamens and five styles, and a most peculiar characteristic is the strong spiral spring-like beak which is able to project the seeds to a distance of seven or eight yards.

Geranium

Eng.: Cranes-bill; *Fr.*: Géranium; *Ger.*: Storchschnabel.

Dwarfer varieties are good for cool and slightly shaded positions in rockeries and borders, the taller for wilder parts among such plants as *Aconites* or *Digitalis*. The flowering season lasts from May to autumn. They are easily grown from seed, which should be gathered very early, since the capsules open soon after sunrise. It is doubtful whether any of the Swiss varieties are really worth inclusion in a garden, though *rivulare* is a handsome plant. All are certainly inferior to the asiatic *ibericum*, for example, or the native English *lancastricense*, the alpine *argenteum*, the pyrenæan *cinereum*. The genus is distinguished by a regular corolla, with ten, seldom five anthers; the stem is usually divided into two forks, bearing palmate leaves. The whole plant has a strongly aromatic scent.

G. rivulare (*G. aconitifolium*) (Pl. XXVI). Plant with stems branched above, slightly pubescent; leaves palmate, very deeply cut and veined, greyish-green; flowers with

white, purple-veined petals. July. Granitic Alps between 1000-2400 m.

*G. sylvaticum** (Pl. XXVII). Robust plant with palmate, rather thick leaves, coarsely cut and serrate; flowers very numerous, reddish-violet, with white centres, in large panicles. July-September. Woods and mountain copses.

*G. Phæum** has stems slightly divided towards the top; leaves cut into 5-7 closely adjacent lobes; flowers with flat corolla, dusky-violet (in the variety *lividum* violet-brown). Native of cool meadows in mountain districts.





ROCKERY AT FLORAIRE

ATARI'S GARDEN

Papilionaceæ



The leaves in this order are almost always alternate (*Genista radiata* is an exception) and generally composite; the irregular flowers consist of five petals, of which the two lower, or the keel, grow together at the point, the two lateral ones, forming the wings, are free, and the fifth upper one is reflexed lengthwise and known as the standard; there are ten stamens.

Speaking generally the mountain genera of this order which are suited for garden work are comparatively few; of those catalogued many are only fit for the roughest places, and even in dealing with the more select kind a strictly limited choice should be made owing to the comparative similarity not only of species, but even of genera. Many, also, are murderously rampant.

Genista

Eng.: Broom; *Fr.*: Genêt; *Ger.*: Ginster.

These plants are readily amenable to cultivation, and the bright flowers are very striking. The dwarf and often tufted habit is good, looking well among rockroses, heaths, and other rambling shrubs. *Sagittalis* flourishes in the coldest soil, and with the English *pilosa* and *tinctoria* makes a good enough selection for any ordinary garden; but *the* indispensable one is *andreana*, a glorious mass of gold and copper. Nothing is better for hot, dry, sandy soil. The calyx is tubular, with two lips, the upper divided into two, the lower into three sections; the leaves are entire and undivided.

G. sagittalis (Pl. XXVIII). Small shrub resembling in appearance an herbaceous plant; rootstock prostrate and branched; from it rise small, simple erect stems, bearing two long wings, broken at the intersection of the leaves, which form a large, tufted mass covered with bright yellow flowers, carried in terminal spikes. June-September. Pastures and edges of woods (600-1500 m.).

G. tinctoria * (Pl. XXVIII). Shrub 12-20 in.; the stems are erect, furnished with ovate leaves, which spring from minute stipules; flowers bright yellow in large terminal racemes forming a pyramidal panicle. June-August. Common in moors, pastures and edges of woods. There is a good double form.

G. germanica is distinguished by its spinous branches, and oblong-lanceolate, downy leaves; by the absence of basal stipules and by brilliant yellow flowers in a terminal panicle. June-July. Margins of woods, banks etc.

Cytisus

Eng.: Laburnum; Fr.: Cytise; Ger.: Goldregen.

Two species are found in Switzerland, both tree-like in habit which sometimes grow to the height of over thirty feet, or gracefully drooping shrubs. As the present work does not deal with trees, readers are referred to my special book on that subject¹.

Anthyllis

Eng.: Kidney Vetch; Fr.: Vulnéraire; Ger.: Wundklee.

The species *montana* (and variety *rubra*) is useful in dry sunny banks, as it resists the extremest cold and moisture. Limestone and good loam is the most suitable

¹ *Nos arbres*, H. Correvon; illustrated and published by Atar, Geneva.

soil and a top-dressing from time to time is beneficial. Easily propagated by division or seeds. It is distinguished by a five-toothed, persistent calyx, which withers after florescence, and its cymose heads of bloom.

*A. vulneraria**, variety *alpestris* (Pl. XXIX). Dwarf with leaves of five or eleven unequal leaflets, the terminal one being very large; inflorescence definite, in simple or compound capitules; corolla rosy-white (yellow in the type). July-August. Alpine pastures. Not a garden variety.

A. montana. Grassy plant; root-stock woody and running, spreading over the ground which it sometimes covers for large spaces; leaves greyish, with silky hairs, many-foliate; flowers rose, fragrant. June-August. Southern Jura (Dôle, Creux-du-Van, Salève).

Trifolium

Eng.: Trefoil, Clover; Fr.: Trèfle; Ger.: Klee.

The only species really worth cultivation is *alpinum*, which should be raised from seed as collected plants are practically impossible to acclimatise. The generic characteristics are interesting, as the genus includes the plant commonly accepted as Shamrock (*T. dubium*). The calyx has five long, sub-equal teeth; the corolla persists after florescence, and the stamens are more or less adnate or growing on to it; the leaves are divided into three leaflets; the flowers are gathered into heads or cylindrical spikes.

T. alpinum (Pl. XXIX). The root-stock is short and branched, so that large tufts are formed from which spring glabrous, finely toothed leaves; the flowers are large and rosy, each carried on a very brief stalk and massed, four to six in number, in a loose and globose head. July-August. Alpine pastures, between 1200 and 2500 m., where it covers vast areas.

A considerable number of other trefoils are found in the Swiss mountains, of which the most important are *T. alpestre*, a plant with soft hairs, stems 4-12 in., erect, simple, bearing at the apex rosy-purple flowers in globose heads, enclosed by 2 leaves, with downy calyx; *T. montanum*, reaching 16 in., with white flowers in globose clusters, and oblong, finely serrate leaflets. Lastly *T. Badium* and *spadiceum*, with yellow flowers, those of the former in small, globose heads, of the second in cylindrical heads; all are found almost everywhere in the alpine zone.

Oxytropis

A genus of low, almost sub-shrubby plants, whose spreading, tufted branches hug the ground; the leaves are composed of many opposite leaflets, with flowers generally racemose, the calyx having five divisions, and a keel that terminates abruptly in a small, soft point. The best variety *pyrenaica* is not Swiss; the flowers of *Halleri* are of charming gentian blue. This last species seems in England to prefer a dampish situation, whereas the majority like a well-drained, dry, open position among broken limestone or gritty sand. The only method of propagation is by seeds. The Swiss varieties are:

O. montana (Pl. XXX). Root-stock short and branched, emitting many, prostrate stems; leaves with 9-15 pairs of oblong-ovate leaflets; flowers of purplish wine-rose, shading to blue; pods swollen and reddish. July-August. On rocky, sunny slopes of the Alps and southern Jura.

*O. campestris** (Pl. XXX). Downy plant, with leaves of 10-20 pairs of leaflets, softly hairy, oblong-lanceolate; flowers yellow, united 5-10 in globose racemes. July-August. The Alps in gravelly pastures and torrent-beds, descending down to the valleys.

O. fœtida. Glandular, viscid, glabrous, with an unpleasant odour; leaves with 15-20 pairs of leaflets; in other respects like *campestris*. July-August. Alpine rocks (1000-2000 m.).

O. pilosa. Plant with hoary down; stems 12-16 in., simple, erect; leaves with 10-13 pairs of lanceolate leaflets, flowers of very pale yellow, in compact, ovoid racemes. May-July. Rocky swards of warm and sunny alpine valleys.

*O. Halleri**. Downy and whitish; root-stock short and branched; leaves with 12-14 pairs of ovate-lanceolate leaflets, velvety; flowers lilac, in a short, oval, compact raceme, at the extremity of a stem of 4-8 in. April-June. Warm, sunny places in the Alps and valleys of the alpine region.

Astragalus

Eng.: Milk Vetch; Fr.: Astragale; Ger.: Traganth.

Like its kinsman *Oxytropis* this genus is only to be multiplied by seed. The species are not of much garden value, though *monspessulanus* may drape a rock-face and *Onobrychis* come in for a rough corner. All like a dry, sunny position, wedged among rocks. The distinction from *Oxytropis* is the absence of point to the keel.

A. Onobrychis. Gray-green in tone; root-stock branched and creeping on or under the soil; leaves of 8-12 pairs of oblong-lanceolate leaflets; flowers of bluish-purple on spikes at first ovoid, later oblong; arranged by threes on an erect peduncle. May-July. Waste spaces on slopes and along alpine paths in warm districts.

A. monspessulanus. Tufted habit; leaves with 10-15 pairs of ovate leaflets. The deep crimson of the unopened flowers passes to rosy lilac with streaks of white. The

leaflets bear a few white hairs on the underside, while *Onobrychis* is smooth on both. May-July. Rocky places in Alps (800-1500 m.).

A. aristatus. Spinous plant, with long, prostrate branches, forming broad, flat bushes; stems 4-12 in., bearing on the upper portion hairy leaves, with 6-10 pairs of narrow leaflets, terminated by a spine; flowers clear yellow and violet, hidden at the base of the leaves. May-July. Sunny rocks and slopes of the southern Alps.

Coronilla

Eng.: Crown Vetch; *Fr.*: Coronille; *Ger.*: Kronwicke.

Pretty, half-shrubby plants, but of no striking merit, yet showy in their way, free growers and hardy, therefore useful for rougher parts of rockwork. *Iberica* however should be preferred to those mentioned below. The characteristics of the genus are a short, bell-shaped calyx, with five teeth, the two upper ones joined along their lower edges; the seed pod is narrow, articulate, and somewhat sickle-shaped; the flowers yellow or lilac.

C. vaginalis (Pl. XXXI). A prostrate plant with spreading branches and leaves divided into four to six pairs of leaflets; flowers yellow, 6-10 in number. May to July on stony escarpments of the Alps and Jura.

C. montana. Stems erect, hardly branched; leaves bluish-green, leaflets ovate or obovate; flowers clear yellow, larger than *vaginalis* and in larger umbels, pods pendulous with 3-4 joints. Jura.

Hippocrepis

*H. comosa** (Pl. XXXI). Differs from the Coronillas in its flat pod, which is deeply notched on the upper margin.

The stems are ascending, the leaves with 5-8 pairs of leaflets; flowers clear yellow, in nodding umbels. May-June on the slopes of the Alps and Jura. From seeds.

Hedysarum

H. obscurum (Pl. XXXII). A stoloniferous, trailing plant; leaves with five to nine pairs of oblong-ovate leaflets; flowers large, nodding, of dark purple-violet, arranged in 1-2 loose racemes on the summit on the stem. July-August. Cool places in mountainous districts (1500-2400 m.). The genus to which this species belongs is comparatively unknown in gardens, but several are not without charm sufficient to deserve recognition and all are of absolute hardiness in sloping, sandy loam.

Phaca

Eng.: Bastard Vetch; *Fr.*: Phaque; *Ger.*: Berlingse.

A near ally of *Oxytropis* and *Astragalus*, with an obtuse, pointless keel; the swollen pod opens by one valve; the flowers are in racemes on long stalks. Not a garden genus.

P. alpina. Strong-growing plant, erect, like a small shrub, slightly viscid, many-branched; leaves with 10-12 pairs of oblong, blunted leaflets, downy underneath; flowers yellow, few, in short racemes and followed by swollen, green pods. July-August. Grass slopes of the Alps (1200-2000 m.).

P. frigida differs in a lower, unbranched stem; leaves with 4-5 pairs of broad, oblong-ovate leaflets, larger flowers of yellowish white, in short, orbicular racemes; lastly by an oblong, acuminate pod. July-August. Stony alpine pastures from 1700-2000 m.

*P. astragalina**. Small plant with stems 3-4 in., 6-10 pairs of small, ovate leaflets; drooping flowers of white and violet-blue in short, globose racemes.

Orobus or Lathyrus

Eng.: Vetch or Everlasting Pea; Fr.: Orobe or Gesse;
Ger.: Wald or Platterbse.

The wild peas, with flowers mostly rose or carmine, which are found in the Alps, belong to *Lathyrus*. Their leaves, composed of 2-3 pairs of leaflets, are terminated by a tendril, which allows them to fasten on to shrubs and climb. Some are strongly scented, others scentless. The genus *Orobus* only differs in the greater number of leaflets composing the leaves, which are without tendrils, and the erect and shorter stems.

O. luteus (Pl. XXXII). Angular, erect stems; leaves of two to five pairs of large leaflets, ovate, glaucous underneath; flowers yellowish, large, in erect racemes equal to or exceeding the leaves. June-July. Grassy escarpments of the Alps and southern Jura.



Rosaceæ



This important order includes herbaceous plants, trees and shrubs; not the least of its interest lies in the number of fruits furnished by it — apples, pears, plums, raspberries, strawberries and others. The alternately arranged leaves are either simple or composite and, except in the case of *Spiræa Aruncus*, accompanied by stipules; the flowers are regular, the calyx, which is persistent, composed of four to five divisions, often associated with an involucre of bracts alternating with the sepals, which are equal in number to the petals; the stamens vary in number and, like the petals, are inserted on the calyx; the fruit consists of carpels, either free or adnate.

Dryas

Eng.: Mountain Avens; *Fr.*: Dryade; *Ger.*: Silberwurz.

Beautiful prostrate alpine which does well anywhere in rockeries, old walls, sunny slopes and borders, where a light, cool, pebbly soil and fair amount of sun can be given. Deep rooting root must be given and it is almost useless to remove established plants, which if left alone will make large patches. Young plants may be divided in spring, but seed is the only way though slow of raising a new stock. Limestone is desirable. A popular name is *Thé Suisse*, in the composition of which it plays a great part; the country folk frequently make a pleasant astringent or digestive from the glossy leaves by infusion.

*D. octopetala** (Pl. XXXIII). A small, trailing shrub, often creeping over large pieces of ground; the leaves are oblong, with roundish notches toothed like a saw; the large, solitary flowers, like small single dog roses, are carried on scapes four inches long; the corolla is divided into eight to twelve white divisions, enclosing a sheaf of bright yellow stamens. June-August. Rocky hill ground (800-2000 m.).

D. Drummondi, an ally from N. America, has yellow, drooping flowers and requires similar treatment on the whole, but rather more moisture at the root (mix in some peat).

La Dryade

Nymphe des monts, blanche et légère,
Coupe de nacre au centre d'or,
Dryade au merveilleux décor,
Je te salue et te vénère.

Trésor d'amour, trésor de grâce,
De candeur, de simplicité,
Ta fleur chante la pureté
Et l'antiquité de ta race.

Gracieuse, pâle et candide,
Elle entr'ouvre aux feux du matin
Son voile d'or et de satin
Et sa robe au décor splendide.

Salut, fleur que la Providence
A placée aux flancs de ces monts!
Tu seras pour nous qui t'aimons
L'étincelle de l'Espérance.

H. C.

The dryad wood-nymphs have been long forgotten; they have fled for refuge to the high hills, where they still, changed to gracious flowers, protect the forests; for these humble, trailing shrubs preserve the coolness and moisture necessary for the germination of the seeds of

trees. The Rev. H. Friend speaks at length on the Dryads in his charming book on Flower-lore¹.

Geum

Eng.: Avens; *Fr.*: Benoîte; *Ger.*: Benediktenkraut.

The two species mentioned are splendid rockery plants and quite easy both to raise from seed and to keep in vigorous health. Indeed *G. reptans*, perhaps the finer, becomes gross and lazy except in the poorest of soil, and almost refuses to flower except in almost pure sand, or grit, or hungry crevice. The position should be cool, dryish, facing either east or west. *Montanum* is easier, doing well in any good soil and partial sun. Their beauty does not cease with the flowers, which are succeeded by graceful, feathery seed-tassels. The roots are faintly scented with clove, and a wine distilled makes an excellent stomachic. A decoction, also, or an infusion in hot baths is used to cure whitlow. The characteristics are a persistent calyx with ten divisions in two ranks, the five exterior smaller and forming a calycul; the petals seldom exceed five but the stamens are numerous.

G. reptans (Pl. XXXIII). A beautiful plant with hard, brownish stem; putting out long stolons like red-brown threads, which in turn put up aerial heads; leaves very deeply cut; immense flowers of beautiful yellow, followed by tufts of twisted, plumose awns. July-August. Stones and rocks of the high alps (1900-2000 m.).

G. montanum differs from it in that the stem is without runners, and the scapes overtop the leaves, which are divided into very unequal segments, the terminal being very large; flowers smaller and of a darker yellow. All mountain pastures (2000 m.).

¹ Flowers and Flower-lore. Vol. I., pp. 38 et seq.

Spiræa

Eng.: Goat's-beard or Meadowsweet; Fr.: Reine des Bois;
Ger.: Geissbart.

S. Aruncus. A strong, erect plant, often exceeding five feet with large three-foliate leaves. The yellowish-white flowers are individually small but very numerous and united into a huge, pyramidal panicle of great beauty. Though a shallow rooter it is grateful for deeply trenched soil, which should contain peat and such like retentive material, but at the same time the position should be sunny and away from shrubs or trees. It is most effective in bold, isolated clumps. May-June, in moist mountain copses.

Potentilla

Eng.: Cinquefoil; Fr.: Potentille; Ger.: Fingerkraut.

A genus containing many species with a persistent calyx of eight to ten lobes in two whorls, five (sometimes four) entire or emarginate petals and many stamens. It has been so much improved under cultivation that, for beauty, the garden hybrids are much to be preferred, but several natural species are useful border plants and a few worthy of a rockery, great care being taken to prevent them running wild. The best are *alba*, *atrosanguinea*, *aurea*, *Fenzlii*, *nepalensis*, *nitida*, *reptans** (var. *plena*), *verna**. In many the real charm often lies in the foliage, so that care must be taken, while giving the open and elevated position congenial, not to place them too high to be effective. The soil should be gritty loam, not over-nourishing, and the runners call for regular topdressing.

The chief European alpine are:

P. aurea (Pl. XXXIV). Dwarf plant; stems slender, horizontal, leaves with five oval leaflets of shining green,

hairy, silky at the margins; flowers bright gellow, tinged with orange at the base, in loose panicle. June-August. Meadows and pastures of all mountains in the alpine or subalpine zone.

*P. alpestris** is particularly distinguished by duller leaves, the radical ones arranged all round the stem, instead of only on two sides as in *aurea*. July-August. The middle zone of the Alps and Jura.

P. minima is a miniature *aurea*, with 3-foliate leaves, small flowers, yellow and solitary. Found in rocky pastures of the Alps, between 1400-2500 m.

P. grandiflora (Pl. XXXIV). Stems tall, 4-12 in., branched; leaves 3-foliate, hairy, deeply serrate, of a greyish-green; flowers large, of a beautiful golden yellow. Dry, warm, alpine slopes.

P. nivea. Small plant with downy, greyish leaves, 3-foliate, snow-white below; flowers yellow. June-August. The higher slopes of the Alps from 1800-2500 m.

P. frigida differs in the sombre appearance of its foliage, which is very hairy and slightly viscid; small 3-foliate leaves, the leaflets bluntly toothed all round; small greenish-yellow flowers; petals hardly exceeding the calyx. Grows on elevated parts of the Alps, wind-swept arêtes, high passes and naked peaks (2200-2600 m.).

*P. rupestris** (Pl. XXXV). Pubescent, glandular; the flower-stems reddish-brown, branched, erect; leaves pinnate, 5-7-foliate; flowers white, many, in loose panicles. July-August. Warm, dry places in the granitic Alps.

P. caulescens. A tufted plant which is seen hanging from sunny, calcareous rocks in the Alps, the silky, silver foliage and yellow-white flowers enamelling the heart of the hardest rocks.

P. nitida, with silver leaves and pink flowers, from the Southern Alps.

Cinquefoils are of easy culture in any open rockery; *nivea* and *frigida*, however, are more troublesome, and *caulescens* prefers a wall or sunny crevice in the rockery. Two magnificent himalayan species are in cultivation: *P. atrosanguinea* with blood-red flowers, which in the garden of Rambertia, at 2000 m., has proved a veritable marvel, and *nepalensis* with flowers of delicate rose veined with bright carmine.

Rosa

Wild roses are common in the Alps (Gremli enumerates some dozens) — so common that readers will be thankful to be spared an exhaustive enumeration. The best loved is:

R. alpina (Pl. XXXVI) or the *Thornless Rose*, the place of thorns being taken by numerous, tiny, far scattered and almost invisible spikelets. It does well and is all too little known in gardens, where it is welcome for its earliness and interesting as a reputed parent of the *Boursaults*. The flowers, however, lack the full brilliance of the mountains.

It grows into low bushes, barely rising more than three or four feet from the ground, garlanded with beautiful flowers of purest carmine and deliciously fragrant. The fruits (*cynorrhodons*) are used to make an astringent conserve, which is employed in cases of chronic diarrhœa; the seeds, washed and dried before use, provide an excellent tea which is drunk by purist vegetarians, who refuse any other. The tea requires an hour's stewing and is both pleasantly flavoured and delicately scented.

In the south-western calcareous Alps and in the Jura a dwarf rose is to be met, whose branching stems (20-40 in.) are furnished with fine thorns of varying length; the 7-11-foliate leaves are small and rounded, bearing many

large flowers of white, faintly tinged with a shade of yellow, to which succeed small, brown fruits, passing to violet-black; this is the *R. pimpinellifolia*. It does excellently in gardens. *R. pomifera* is a strong, tufted shrub with short, straight branches, large, oblong leaves, very fragrant flowers of beautiful rose, fleshy, ovoid, rounded fruits covered with resinous, pine-scented hairs¹.

Alchemilla

Eng.: Lady's Mantle or Lady's Smock; Fr.: Alchemille;
Ger.: Frauenmantel.

Flowers minute, composed of a calyx alone, without petals; stamens 1-4.

The genus is not a showy one, though the appearance of the foliage, often silvered below, is charming. Delicious indeed in the serene grandeur of the alpine world is the effect of the big dew-drop nestling in the silken folds of a leaf of *Alchemilla* and sparkling against the morning sun. Each is a jewel in the alpine coronal, whose gleaming diamonds are linked one with another in willing service to the enrichment of the glorious picture and add their part to the charm of the fair harmony.

Alchemillas also play an important part in mountain economy, for they furnish the most valuable constituent in alpine fodder. Lord Avebury, in his delightful work on the "Beauties of Nature", mentions a fact, to which I called his attention in 1898, that the quality of Gruyere cheese is mainly owing to the abundance of these plants.

¹ E. Rambert remarks that the Rose des Alpes is an Eglantine and in no way related to the Rhododendron, which has most improperly been called "The Alpine Rose". A few such confusions are on the way to make language an everlasting enigma. *Les Alpes Suisses*, Vol. 1., p. 106.

Alchemilla is sacred in Iceland and named *Mariastaiðker*. A few shoots under the pillow are reputed to secure tranquil sleep.

*A. alpina** (Pl. XXXVII). Stems slender; leaves palmate, 5-9-partite; leaflets serrate at the tip, green and glabrous above, silvery-silk below; flowers in small, paniced corymbs. Flowers the year through; all Swiss mountains. *A. vulgaris**§ has nearly orbicular leaves, with 5-9 ovate, dentate lobes, and flowers in small panicles.

One also meets in Swiss mountains *A. fissà*, a somewhat glabrous plant, approaching to *vulgaris*, but differing in the shallower dentation of the leaf-lobes, which are separated from one another by a division running far into the lamina; *pentaphyllea*, with slender, flexuous stems, leaves palmate and divided into 3-5 small, cuneiform segments. It may further be distinguished at first sight from the others by the stoloniferous stems, putting out roots at the nodes, and by its aggressive disposition. On the flatter snow-slopes of the Alps, between 2000-2500 m., it creates absolute wastes — an infallible symptom of a cold and damp locality.



Onagrarieæ



Herbaceous plants or shrubs; leaves opposite or alternate, simple, exstipulate; flowers usually solitary or in racemes or spikes; calyx generally with 4 divisions, forming a valve, which, e. g. in *Ænothera macrocarpa*, is much elongated; petals borne on the calyx alternately with the stamens; stamens 1-2 seriate; style simple; fruit mostly capsular, sometimes a berry as in the *Fuschia*.

Epilobium

Eng.: Willow-Herb; *Fr.*: Epilobe; *Ger.*: Weidenröschen.

No one can deny the magnificence of these gorgeous beauties — in their proper place — whether the common *hirsutum* in hedge-row or railway cutting, *angustifolium* in its native glades or arrogantly overrunning the wild garden, or the exquisite *Dodonæi* and *obcordatum* (from the Rockies) in the alpine rockery — yet even these to be planted with careful regard for the weaker folk, being themselves infected with the masterful spirit of the family. They are distinguished by a longish calyx-tube, yet not prolonged above the ovary, with a four-partite limb, deciduous after florescence; the petals are four, the stamens eight, of which every other one is shortened.

E. angustifolium * (*E. spicatum*). This is the plant with strong, tall stems, bearing laureolate leaves like to those of the willows known in France as *Laurier de St-Antoine*

and in Switzerland as the flowering Willow or Osier (Rose-bay Willow), which produces the glorious vivid carmine spikes which are one of the finest ornaments of our mountain landscapes. It springs up in the cool, rocky glades of all our hills, flowering from July to September with an effect that is at times startling. The large rosy clumps — for the plant always grows in masses, masses which sometimes end in whole hill-sides covered with brilliant carmine flowers — are one of Nature's glories, and the note they strike in the full, grand harmony of colours, is a note of gaiety, of triumph, of confidence and happiness. There is a "joie de vivre" about these lordly Willow-Herbs of the alpine glades, rejoicing with an arrogant joy in the fair portion of their lot — a little exclusive, we admit, for they know no pity for the weak, and will not, in their glorious beauty, that they should suffer restraint or any abatement, but that every rival be banished and trodden down. Near Fribourg the plant is known as *Salade de lièvres*; people there are said to be very partial to the leaves, which would appear to have balsamic and detergent properties.

It is an encroacher and must be given partial shade in a cool rockery. Nice clumps are to be seen at St-James Park in the heart of London; their effect is superb from May to July. At Floraire a glorious variety with pure white flowers is cultivated and much admired by visitors.

E. Dodonaei (*E. Fleischeri*) (Pl. XXXVIII) is the plant with fine spikes of large flowers, the corolla clear rose, the calyx vivid carmine, which enlivens alpine gravels, dry torrent beds, cracks in glacier moraines. True to the principles of its race, it shows the invasiveness of the born colonist.

E. rosmarinifolium differs in its taller growth, more ramified habit, long flower-spikes of less vivid rose. Grows

in quarries and stony places of mountains, especially on chalk.

E. alpinum * is an altogether small plant; stems slender; leaves oblong, glabrous, shining green, rosulate; flowers small, very vivid rose-carmine, on a curved spike. Moist places in the Alps and Jura (1000-2000 m.).



Crassulaceæ



Everyone is familiar with the succulent aspect and fleshy leaves that are so characteristic of this order, which is represented in England by *Tillaea* and *Cotyledon* (Navel or Pennywort) as well as the two garden genera mentioned below. The leaves are simple, entire and without stipules; the flowers usually regular, generally with five divisions, arranged in what are known as scorpioid cymes or corymbs; the calyx is persistent. Both *Sedums* and *Sempervivums* are of the easiest culture in gritty soil (limestone, as a rule, by preference) and full sunshine. *Sedum villosum*, a charming native found on Ingleborough, requires considerable moisture. Both genera are extremely extensive and it is impossible to find room for anything like a comprehensive collection without specialising; many, also, of the *Sedums* at least, are little better than weeds. Of those mentioned below *Sed. album*, *alpestre*, *Anacampseros*, *Rhodiola*, *villosum*, *Semperv. alpinum*, *arachnoideum*, *Gaudini*, *tectorum*, *Wulfeni*, would be representative, but some are inferior to foreigners such as *Sed. sempervivum*, *brevifolium*, *kamtschaticum*, and *Semperv. Laggeri*, *speciosum*, *Wilsonianum*.

Sedum

Eng.: Stonecrop; Fr.: Orpin; Ger.: Fettblatt.

Calyx with 5, rarely 4 or 6-8 sepals; petals always as many; stamens 10, rarely 4-5 or 12-16, generally in two ranks; flowers in corymbiferous cymes or terminal panicle; leaves thick, fleshy, flat or cylindrical.

S. Anacampseros. Stems spreading and ascending, 8-10 in., surrounded with thick, fleshy leaves, rounded and flat, and forming on the upper part of the stem close, cylindrical rosettes of glaucous green; flowers small, reddish, in a flattened, compact cluster. July-August. Rocks of granitic Alps (1400-2000 m.).

S. alpestre. Straggling, glabrous; stems sometimes 8 in., simple or a little branched; leaves oblong-ovate, cylindrical; flowers pale yellow, 2-5 in close corymb. July-August. Rocks and detritus of the granitic Alps.

*S. album** (pain de souris) is the familiar succulent, common on old walls, stone-heaps in the lowlands, and climbs up to the alpine zone, always beautifying parched and rocky places. Stems slender, zigzagging over the rock and forming tufts of ovate, cylindric leaves, decked with flowers of rosy white, in corymbose cymes, more or less loose. *S. acre** (wall-pepper, Vermiculaire) is a dwarf Orpine, with bright-yellow flowers, growing in cushiony tufts and forming thick swards of short, triangular leaves, and gay with brilliant golden flowers, arranged in 2-3 spikes gathered in a little corymb. Found spreading over walls, rocks and house-roofs throughout Switzerland.

In the higher alpine regions the small, annual species *S. annuum* and *S. atratum* are to be found. The characteristics are — of the former flexuous, often branched stems, with short, narrow leaves and terminated by a divided cyme of tiny, greenish-yellow flowers; of the second stems shorter, thicker; leaves very many, imbricate, clear green passing afterwards to reddish; flowers whitish with a green central line.

*S. villosum** is a delicate, little biennial; foliage brownish, pubescent, glandular; beautiful bright rose flowers in an irregular corymb. Haunts moist places in the valleys of

Turtmann, Arolla, and of the Vaudois Alps in Cantons Vaud, Grisons and Berne.

S. Rhodiola is a curious looking plant, glabrous and bluish, with a tuberous, violet-scented rootstock; leaves stout, toothed at the tip; flowers yellowish in a compact, terminal cyme. Here and there in granitic Alps.

Orpines are prescribed for the removal of warts and corns by reason of their biting and astringent properties; they are said to hasten the cicatrizing of wounds; *S. album* is a refrigerant. In old times lovers drew omens from them, and occasionally people may still be found who believe in their efficacy during thunder storms.

In cultivation they are good-humoured creatures; nothing hurts them; any position satisfies them; given a scrap of earth in a sunny rock and they will decorate it to perfection.

Sempervivum

Eng.: Houseleek; Fr.: Joubarbe, Artichaut sauvage; Ger.: Hauswurz.

Calyx and corolla with 9-12 divisions; stamens twice as many as the petals; inflorescence cymose.

S. tectorum *. The Houseleek proper or Herbe du tonnerre, is a sturdy plant with thick, densely rosulate, ciliate leaves forming a rosette which looks like a glabrous, bluish-green artichoke; flowers large, brownish, copper rose, in a thyrsoïd cyme. Grows in stony places of warm and sunny mountains. July-August.

S. montanum (Pl. XXXIX). The root-stock puts out many offsets radiating from the central rosette; flowers large, brownish-rose. Alpine rocks (1200-2400 m.).

S. arachnoideum (Pl. XXXIX) (Nid d'araignées, Herbe à l'aragne). Leaves in compact rosettes, covered with long, white, woollen threads, interwoven from the tip of

one leaf to another; flowers of brightest rose. Alpine rocks, specially of Valais and Ticino. July-August. *S. Fauconnetti*, which is found on Reculet and in a few places in Valais, is intermediate between *tectorum* and *arachnoidum*; the leaves are finely glandular, glabrous, but fringed with long, woolly hairs, the upper ones forming a flocculent termination; flowers large, rose. July-August. In *S. Funkii* the leaves of the rosettes have a deep fringe, are pubescent-glandular on both surfaces, but the hairs of the fringe are much longer than these bearing the glandules. Rare; Grisons and Valais. *S. alpinum* has thick, oblong leaves; flowers of beautiful, bright rose, veined with purple; petals narrow and ciliate. Rather rare; Valais and Grisons.

Switzerland has two *Sempervivums* with yellow flowers; *S. Wulfeni* from the granitic Alps of the Grisons, distinguished by the glabrous underside of the leaves, which are large, bluish-green in a stout, shallow rosette with a brown centre; beautiful lemon coloured flowers; and *S. Gaudini* with pubescent-glandular leaves, russet-brown at the tip, and scented like resin; flowers of luminous pale yellow, the petals three times as long as the calyx. This last species belongs to Italy and has been found on the south side of the Valaisian Alps at Zwischbergen, that is, near the Italian frontier. Madame Julia Correvon discovered in 1887 a gloriously rich habitat on the north slope of the Alps, in the neighbourhood of Liddes, so that the plant is really indigenous in Switzerland.

House-Leeks are excellent rock-plants; they love full sun and are most obliging as to soil. Their unique foliage, sometimes jewel-like in its perfect symmetry, makes them first-rate for the decoration of rocks, walls, gardens and even for cultivation in pots in windows and balconies. There are numerous different varieties and forms; and the number of amateur collectors is ever on the increase;

for, as the name indicates, they are everlasting and it is difficult to injure them on account of the abundance of moisture contained in the leaves. I have seen admirable collections in most uncongenial surroundings in the heart of London and of Paris; some stocks known to me are over fifty years of age. The acid and astringent juices, with which the leaves are gorged, are used in pharmacy to remove corns. The common houseleek is also considered a diuretic and antiscorbutic. It was revered by the ancient Danes as sacred to the god Thor and as protector of dwellings against the devil. For this reason it was planted on roofs, where, for that matter, it thrives excellently without any other soil than that of the mould formed from its own leaves. Ancient Germans also planted it on roofs to protect the house against thunder. To the Romans it was known as Jovis barba — hence the French Joubarbe — that is, the beard of Jupiter, the god of thunder and lightning, and it is more than likely that even then the idea of protecting houses was attached to it.



Saxifragæ



From the gardener's point of view the interest of this order may be said wholly to gather into the typical Saxifrages, so paramount being the value of that one genus in comparison with that of the other eighteen. The botanical characteristics of the order are :—leaves alternate (sometimes opposite), without stipules; inflorescence generally racemed or paniced, rarely solitary; calyx with five lobes; petals five, regular or dimorphous i. e. exhibiting two forms in one flower; stamens five or ten; ovary with two beaked styles and containing minute seeds. It is peculiar to the high mountains of the northern hemisphere.

Saxifraga

Eng.: Saxifrage; *Fr.*: Saxifrage; *Ger.*: Steinbrech.

Whatever may be the reputed origin of the name, nothing could be more appropriate for the genus par excellence of the rock-garden, to which it has given more varieties than any other, whose number is only equalled by their surpassing intrinsic merits. Even the family of Primulas, despite the typical genus and the Androsaces, and the Gentianeæ must take a second place. The characteristics which differentiate the genus from the order are :—ten stamens, two styles which are persistent and twin-beaked capsules containing cells or compartments. The almost innumerable number of varieties exhibited has made classification a matter of sore trouble;

nowhere perhaps in the botanical world does such confusion exist, but the best authorities have at last brought something like order into the chaos by a division into sixteen sections, of which some ten are represented in the varieties mentioned below. Still for practical purposes in the garden it is not more useful than the popular grouping into incrustated (or silver) saxifrages, mossy saxifrages, cushion saxifrages, London Prides, etc. As to culture they are the easiest, on the whole, of alpinists to grow, easily propagated by seed or division (except the Kabschia group, with which it is somewhat risky). The smaller, rarer alpinists need moist, sandy loam with plenty of grit and broken stone, regular top-dressing, and firm planting. Established clumps of the mossy and creeping kinds have a habit of turning brown in the heart of the plant; when this happens top-dressing, which appears at first sight the obvious remedy, is of little use; the only preservative is to tear the plant in pieces and strike the fragments, a thing readily done and invaluable as a means of giving new life and vigour. Speaking generally the mossy varieties are best for carpeting, the silver most useful, the Porphyreion group most brilliant in flower and the Kabschia most utterly charming. The multiplicity of natural varieties has still further been augmented by an ever increasing number of garden hybrids and it would be beyond the scope of this work to attempt a selection; it must suffice to say that of those here described the best are *aizoon*, *longifolia*, *cæsia*, *cotyledon*, *diapensioides*, *mutata*, *oppositifolia*, *retusa* and *Rudolphiana*; on the other hand *androsacea*, *aphylla* and *varians* are poor, dingy things, best omitted.

The section *Euaizoonia*, which corresponds to the group popularly known as "silver," is distinguished by rosettes of hard, fleshy leaves, with a white deposit at the edges. The varieties are of the easiest growth, in full

sun on moraine-like rockwork, where the exposed portion may be baked and the roots find deep and very gritty soil to penetrate.

S. cotelydon (Pl. XL). This is the beautiful Saxifrage with regular rosettes, and large leaves of glistening dark-green, bordered with a line of fine, silvery teeth, which may be seen springing from the deepest crevices in the granite of the Simplon, the Mont-Blanc chain and particularly of the valleys of Upper Italy. In July or August the flower-scape pushes forth, rising to a height of 20 in., and bearing innumerable, large white flowers, spotted with rose at the base of the petals and set off in clear relief upon the deep red of the stem. It is one of the choicest varieties for cultivation, either in pots, or in the open, but above all in rockeries and old walls. The only thing it fears is abundance of chalk.

Here and there in the Alps, on moist slopes where a little rock is mixed among the earth, we find *S. mutata*, whose dark green leaves, pitted and notched on the margins, with ciliate hairs towards the base, are arranged in rosettes very similar to those of *S. cotelydon*. This rosette on reaching a certain age, rises in a stem of 8-20 in., covered with glandular hairs, and bearing a pyramid of orange-yellow flowers, after which the plant dies. It is a useful, ornamental plant, whose only requirements are a rather heavy, moist soil and partial shade.

S. aizoon (Pl. XLI) takes smaller forms and is of more modest appearance. It is the most widely spread of the Swiss Saxifrages, being found on all rocky ground. The leaves, grey-green, elegantly crenate and edged with white teeth, form rosettes from which rise tall scapes bearing white flowers spotted with purple and arranged in pyramidal paniculate cymes. It is a most variable species and is found in many different forms and colours

from one end of the alpine chain to the other. Consequently collections of Saxifrages, at least in respect of this particular group, attain considerable size, rivalling in numbers those of Sempervivums. The variety *flavescens* from Arolla with lemon flowers is as magnificent as rare.

In popular parlance the "London Pride" group has been used to include not only the botanical section *Robertsonia*, to which *S. umbrosa* belongs, but also any species showing rosettes of leaves and feathery plumes of flowers similar in general appearance to those of that typical plant. As such it is used to include *S. stellaris* (of the *Boraphylla* section), *S. rotundifolia* (of the *Miscopetalum*) and even *S. Hirculus*. Speaking generally, most of the "London Prides" prefer half shady, and often quite damp position, though they will grow in full sun, if surrounded by stones to check evaporation.

S. cuneifolia (Pl. XLI). A small native of shady places, throwing from the rootstock large, loose rosettes in broad, flattened sheets; leaves cuneate, thick, coriaceous, crenate, and red below, from which burst the slender, naked scapes bearing small flowers with white, oblong petals, spotted rose and splashed yellow at the base. Woods and shady places of the Alps (500-1000 m.); has been found on the north of the Dôle by M. Romieux. This real member of the London Pride group is rather difficult to grow in Swiss gardens; requires peat or leaf-mould and shade.

S. stellaris (Pl. XLII). A small, tufted plant which grows on the edge of running water or forms colonies among wet beds; the mossy leaves like oval wedges are toothed toward the tip, glabrous, in loose rosettes, from which rise slender, leafless scapes bearing a loose raceme of white flowers, with elongated petals, marked near the

base by two yellow stains. July-August. Alps. Of easiest culture in a swampy place, but likes sun.

S. rotundifolia (Pl. XLIV). Herbe aux cent coutures. A tall, herbaceous plant with handsome kidney-shaped leaves, slightly hairy, on long stalks, and the edges carved into very deep, rounded notches. Bears an abundant panicle of white flowers, spotted purple, and, growing 10-20 in. high, is altogether a showy species. It is found in shady places of all Swiss mountains and is admirably adapted for culture in rockery or border, provided it has some shade and a fairly cool position.

*S. Hirculus**, which grows in the bogs of the Jura, on the Surenen Pass and around Einsiedeln, is a pleasing Saxifrage with large, bright yellow flowers, spotted orange, in 2-3 on the top of the stems; stems 8-12 in., glabrous at the base, woolly above, leafy; leaves entire, linear, lanceolate, glabrous, ciliate at the base. Forms pretty, little tufts which are covered from June to September with charming golden flowers, making a delightful picture in moist situations in an alpine garden. At Linnæa, where it is grown in moss by a fountain, it bears flowers as large as a sixpence. It is a rare native of Scottish bogs. The form *major* is much superior to the common type.

The Kabschia or Cushion Saxifrages are perhaps the most interesting and choice of all. The tiny, tight, little balls of thickly overlapping little leaves, greyish or bluish in hue, not unlike certain Androsaces, should be placed near the eye, wedged hard among limestone crevices on a sloping bank in full sun, where no wet can possibly lodge about the crown. An annual inspection must be given to see that the frosts have not lifted them and a topdressing of chips collar-deep should be given. It is dangerous to attempt to multiply them by division;

seed is the proper way. To this group belong the two following.

S. cæsia (Pl. XLII). A tiny plant, forming a hard, compact tuft, more like silvery moss than anything, built up of countless, wee rosettes; the leaves are small, leathery, with a curve outwards, bluish green, covered with white spots. The white flowers, 2-3 in little, corymbose clusters, are carried on thread-like stems. July-August: crevices of sunny rocks in the limestone Alps (1300-2700 m.). It is a slow grower, and must be kept *very* select, away from weeds or coarser neighbours. Plant firmly in sandy, gritty soil and water in summer. An interesting discovery of Mr. Farrer's in the Oberland, as showing the proneness of Saxifrages to hybridise, is a natural hybrid showing the growth and rosettes of *cæsia* modified by an admixture of *aizoides*, the flowers being exactly intermediate, larger than those of *cæsia* and broader in petal than those of *aizoides*, of warm creamy yellow.

S. diapensioides, as beautiful as small, is like a more compact edition of *cæsia*, the leaves narrower, harder and more erect, crowded into a closely packed cylinder. It is also distinguished by a hairy, glandular stem. Its requirements are those of *cæsia* only more so, especially in the need for a constant supply of finely broken limestone. This rare plant is found on some peaks of the Pennine Alps.

The "mossy" Saxifrages practically coincide with the botanical *Dactyloides*, forming tufted swards of innumerable branches bearing finely divided leaves, close to one another and spreading over considerable areas after the manner of the English *hypnoides*. As a class, they like cool, half-shaded positions and are multiplied without any trouble by division, cuttings or seed. *Muscoides* and *exarata* are the only ones really worth growing.

S. Androsacea (Pl. XLII). Small, tufted plant, pubescent and grass-like; leaves entire, ovate-oblong, erect, with glandular teeth in loose rosette; flowers milk-white, on scapes 2-4 in. high. Frequents moist, cold positions in the Alps between 1800-2500 m.

S. muscoides (*S. varians*). The type of this section, most of which are found in the Swiss mountains, is itself a dwarf, mossy plant, forming compact cushions of clear green leaves, 2-3 ligulate; flowers greenish or reddish, 3-7 in small corymbose clusters. July-August. *S. moschata* differs from it in pubescent, glandular leaves, yellowish flowers and 2-10. *S. exarata* has cuneate leaves, the veins of which on withering become very prominent; flowers white with longer petals. June-August; the Alps. *S. Segueri* is only met near to lofty passes and on snowy aretes of the granitic Alps (2800-3500 m.); forms broad sheets of sombre green; leaves narrow, lanceolate, spathulate, those of the previous year turning dark brown; flowers greenish yellow. July-August.

S. aphylla is a small, mossy plant with innumerable short leaves, entire or 3-5 foliate; leaflets ovate-lanceolate, obtuse, of clear green, and emitting a faint, pleasant perfume; scape short, erect, glandular; flowers solitary, lemon-yellow. July-August. Fissures in shady rocks in the Upper-Alps. This is the celebrated flat-leaved Saxifrage to which E. Rambert has devoted several of his most charming pages—the little Saxifrage of the Oldenhorn.

Somewhat intermediate between the real “mossies” and the creeping Saxifrages of which *oppositifolia* is typical, comes the section *Trachyphyllum*, on which little need be said, as the Swiss species are of no great merit. These are :—

S. bryoides (Pl. XLII). A small, tufted plant with close, short branches, forming a compact sward; leaves linear, very close-set, with short fringes, of a shining green; flowers large, solitary, yellowish-white with golden yellow centre. Barren rocks in the high Alps from 2000-3500 m.

*S. aspera** (Pl. XLIII). Differs from the preceding in the much looser character of its tufts, which are formed of elongated branches; leaves stiff, linear-lanceolate, fringed with long, stiff, sparse and spreading bristles; flowers smaller, grouped by 2-5 in loose paniced cymes. Flowers in summer on rock slopes of granitic Alps.

*S. aizoides** (Pl. XLIII). The small tufted, grassy plant that lines the banks of springs and streams throughout the whole alpine chain. It is composed of very numerous branches, 4-8 in., covered with narrow leaves, of clear green, ciliate on the side, and produces panicles of many orange-yellow flowers in succession from July to October. In the variety *atrorubens* the flowers are of a deep brick-red colour.

The last section represented in Swiss alpine flora is *Porphyron*, which alone approaches in value to the *Encrusted* or in beauty to the *Cushion*. Indeed so far as flowering goes, it has no rival. The plants included are creepers, multiplied by division or seed, and the hint to divide old plants already given should not be neglected.

At the same time, although a top-dressing will not save a plant when decay has once set in, it must not be neglected while health remains; for grit and leaf-mould should be worked among the crowns in autumn.

*S. oppositifolia** (Pl. XLIII). The favourite and choicest of Swiss Saxifrages. Grows in cool spots in the Alps and southern Jura, on glacier moraines, climbing some 1400-2800 m. A dwarf, tufted plant; stems

prostrate and spreading; the branches entirely covered with opposite leaves, which are arranged in four dark green rows with stiff bristles on the edges and ending in a white point; flowers large, sessile, solitary, of most brilliant carmine. These are sometimes so numerous that it is hard to see the foliage through the corollas which plaster the tuft with a carmine cushion. Flowers from the earliest days of spring (May-July in the mountains); in our gardens, where it requires the north side of the rockery or wall, it has flowered as early as February or March. *S. Rudolphiana*, which Gremlé cites as found in the Alps of Valais and Grisons, but which I have not yet met in Switzerland, differs in its shorter leaves, closer branches, more compact habit and the glanduliferous hairs on the calyx-lobes.

S. biflora. A native of icy heights and lofty moraines. Differs from *oppositifolia* in the much looser nature of the tuft, much larger flowers, in 2-3, of variable colour (from rosy-white to blood-red), with petals twice as long as the sepals. *S. Kochii* or *macropetala* has still larger petals, obovate in shape and twice the length of the sepals, and reddish-yellow stamens. *S. retusa*, which Gremlé notices as a native of the south walls of Monte Rosa, but which I have only found on Italian ground, is distinguished by the triangular, 3-5 pointed tip of the leaves, by the much denser habit of its sombre green tuft, and its small, clear carmine flowers, in 1-3 on the tops of the branches.

The above varieties are best grown in deep, open loam in a deep fissure, packed with broken limestone; *retusa* may be better for a little peat. Those who have seen *oppositifolia* burst in glowing sheets of pink the moment the snow melts will infer that copious, even dripping water is necessary in spring; but there must be no stagnation, drainage must be perfect, and especially so

with the higher climbing varieties, *Rudolphiana* and *biflora*, in whose case the proportion of loamy material may with advantage be much decreased.

Saxifrages have no medicinal properties, though some have wished to see in their reputed character of "stone-breakers" an allusion to the disease of calculus, which was said to be able to be healed by them.

Glorious beyond all praise is the Queen of Saxifrages, the Pyrenean *S. longifolia*, whose enormous rosettes of silver-grey far exceed in beauty those of *S. cotyledon*, and whose panicked flowers are of marvellous beauty. Yet it succeeds with great ease in cracks of walls or chinks of limestone rocks.

Parnassia

*P. palustris** (Pl. XLV). A familiar herb found in moist places over all Swiss hills, even those of the great plateau. The ovate-cordate leaves and the large, solitary flowers, white with greenish veins, give one of the prettiest touches in the landscape which it enlivens all the summer through and often till late in the autumn. Culture easy, provided it is given a cool, moist position.



Umbelliferæ



When one considers that the great majority of species included in this extensive order are natives of the north temperate zone (umbellifers being rare in the tropics), its poverty for purposes of alpine gardening is most remarkable. Even comprehensive catalogues seem, as a rule, exhausted with a mention of *Eryngium* and *Astrantia*, though here and there one may find *Meum* and *Bupleurum* considered worthy of inclusion. Not but what the striking effect of a mass of *Heracleum* in the wild garden speaks of its power to adorn a natural landscape; and all who have had an opportunity of admiring those exquisite panels of Paul Robert in the Neuchâtel Museum, which are the glory of our Romance School of painting and charm visitors from all the world over, must remember the impression of exquisite grace and freshness which the grand white Umbellifers, probably *Ligusticum* and *Pimpinella magna*, give to the picture of the Val de Ruz. Again what a perfect touch is given by the glorious umbels of the Angelicas rising along the water's edge to landscapes stiffened by the straight ruled lines of reeds and willows!

On the other hand in pastoral economy the importance of the order is considerable, many species being necessary ingredients in the best of hay. To the kitchen and herb gardens it has given carrots, parsnips, celery, chervil, parsley, aniseed, cumin, coriander and angelica; but side by side with plants of value as foods or spices are many dangerous and poisonous in the highest degree—hemlocks,

dropworts and other such. From the roots and stems of some species are extracted valuable juices and gum-resins, *Asa foetida*, an antispasmodic, *Thapsia*, a violent irritant, *Dorema*, a stimulant and cathartic; the root of *Sumbul*, strongly scented with musk, is a stimulant recommended in case of cholera.

For these reasons the order may be rapidly dismissed from a cultural point of view and the descriptions of species in the main be treated botanically, as they are of interest rather to the collector of wild flowers than to the artistic gardener.

The characteristic of this order is, as the name implies, an umbellate arrangement of the inflorescence. The stem is almost always hollow, with well defined nodes; the leaves alternate, seldom entire (*Bupleurum* excepted), usually much and deeply divided; flowers generally white, occasionally yellow, seldom rose or blue, in umbels, which are mostly compound, but sometimes, as in *Astrantia*, simple or even, as in *Eryngium*, capitular. Calyx-teeth five, petals five; stamens five, alternate with petals; styles two.

Eryngium

Eng.: Sea-holly; *Fr.*: Panicant; *Ger.*: Mannstreue.

Individually the flowers are small and insignificant, but the dense heads into which they are packed and the whorl of bracts forming an involucre or cup below at once arrest attention; the teeth of the calyx are spinous and the fruit a blunted oval, covered with scales.

E. alpinum (Pl. XLVI) or Chardon bleu, Reine de l'Alpe, Chardon-Roland, Chardon béni. The number of popular names by which one plant, and that a very local one in Switzerland, is known, tells the high place it holds in general esteem. Nor can any picture be much more perfect—a stately, hard, strong stem, which at the

time of inflorescence takes in the upper half a cool tinge of steely blue; the broad, hearted-shaped leaves that spring right healthily green from the roots; the feathery bracts and massive cup of violet-blue, placed there (so naturalists tell us) to bar against thievish insects the way to the honey reserved for higher creatures, but which artists expressly affirm to be created to hail its Maker—a cup wondrous in grace, in dignity and serene majesty—all combine to make the absolute perfection. Queen of the Alp, who set thee there and why unfoldest thou all these charms? Who hath spun thy royal mantle and dyed it with the blue of the Tyrrhenian sea? Thou seemest to flee from man and choose some secret cliff, hidden far from noise, vulgarity and prying eyes. Abide there, then, mountain flower; sing in thy solitude the joy of living under the blue sky and in the alpine sun!

There are few plants which succeed better or thrive more generously in gardens than the Eryngos. *E. alpinum*¹ loves a deep soil, sound and rather dry, where it can thrust far its long taproot, and a situation partly shaded from the sun. It is a majestic ornament for lawns, rockeries, the front of shrubberies and borders. To ensure certain germination, the seed must be sown immediately it is gathered; this is our experience at Floraire, where thousands upon thousands are raised for sale and exportation.

There are other species, equally beautiful. From the Pyrenees comes *E. Bourgati*, of low, squat habit, and flowers of a curious violet-blue; from the western Alps *E. spino-alba*, equally dwarf, of a clearer blue; from the eastern Alps *E. amethystinum*, with much divided leaves, and tinged in all the upper portion of the plant an

¹ *Eryngium alpinum* has been taken as the base of ornamentation for the chalet at Floraire and the conventional scheme of decoration is much admired.

amethyst-violet; in the Caucasus we find *E. giganteum*, a splendid plant of architectural forms and of a peculiar greyish-blue; in Turkestan and the East *E. cæruleum* and *creticum*, species with spreading branches, more or less spinous and tinted to the foot with the dark blue of the bracts; lastly there is the Siberian *planum*, a tall-growing kind with small, violet-blue involucre and stems coloured to half their height.

All grow well in any very deep poor sandy soil; *alpinum* except, they are more robust and of better colour in full sun.

Bupleurum

Eng.: Hare's-Ear; *Fr.*: Buplèvre; *Ger.*: Hasenohr.

B. stellatum (Pl. XLVI). A curious, uncommon plant, which grows among sunny rocks in the central and eastern Alps (1500-2300 m.). The brownish-yellow flowers are surrounded by an involucre of large, yellowish green bracts, thus forming little bunches, which in turn are united into a compound umbel surrounded by 2-5 large bracts of the same colour.

Pimpinella

*P. magna rosea** (Pl. XLVII). Burnet-Saxifrages are among the most important herbs of alpine meadow-land. The colour of the flowers varies from yellow-white to the most vivid rose; the higher one climbs, the more pronounced the red becomes.

Astrantia

Eng.: Masterwort; *Fr.*: Astrance, Radiaire; *Ger.*: Thalstern.

*A. major** (Pl. XLVIII). A big, herbaceous plant with palmate leaves and erect stem, 8-10 in.; stamen-like flowers in a dense umbel, surrounded or supported by a

kind of cup or Henri-Quatre-collar, which gives it a very distinct character. All Swiss mountainous districts, from 500-1800 m.

Rambert has honoured it with charming pages in *les Plantes alpines* :— “This is,” says he, “the plant par excellence of the alpine foothills, a good, sturdy daughter who has in her bearing nothing plebeian or vulgar, yet is equally free from all empty effeminacy.”

Fields where the Masterworts abound have an air of gaiety, of country cleanness and honest village plenty. Favrat, a typical Vaudois botanist in his joyous disposition and abundant humour, proclaims in his turn :— “How remarkable ! Since I saw the Masterwort, I have sloughed off careworn humanity, eased myself of all that might overcast my liberty, thrown all the ballast overboard like an aeronaut who must and will rise at all costs.”

On the hillsides near Les Avants and above Caux, on the faces of the Rochers de Naye and the Dent de Jaman a variety with dark-red flowers is to be found, though usually the involucre is greenish-white with a tinge of rose.

Culture of the easiest; at home in any good soil and any partly shaded position. Flowers profusely from July to October.

A. minor is a small, slender and delicate plant; leaves deeply cut, with narrow, deeply divided, glossy leaves; flowers small, white, surrounded with a white collar—still a ruff à la Henri IV—of linear, veined bracts. Rocky slopes of granitic Alps from 1500-2000 m. This is even more charming than the larger variety and equally easy. Both are propagated by cuttings or seeds.

Other species

A few other umbellifers are found in our mountains which deserve mention. In any case *Meum athamanticum*

and *mutellinum* cannot be passed over. In silicious soils of the Alps and of a few valleys in the Jura the former plants huge colonies, reigning in places unchallenged over vast expanses. The fresh vegetation is the finest and most delicate in nature, and the foliage would be highly valued for use in artistic arrangements of flowers, were it commonly known. The culture moreover is easy, if chalky soil is avoided. The root (known in the hills as *racine d'or*) is a carminative and has cured consumptives of whom physicians had despaired. Both it and the allied species *mutellinum* are excellent forage plants and give great value to the pasture and meadow lands in which they grow.

Peucedanum or *Imperatoria Ostruthium* (*Racine du guerrier*) is a plant with fine, ornamental foliage, great umbels of white flowers, and grows in damp, mountain places. The root is used in the Upper Alps as a cattle medicine, and once as an old-time remedy for inflammations of the mucus, cancer and delirium tremens; it is nowadays employed as a sudorific, carminative cordial. In the Upper Valais (so I was told at Gruben in the Turtmanthal) when the herds are incensed before driving them to the hills, roots of *Ostruthium* are burnt on live coals in the stables; this is believed to protect them against mishaps, witchcraft and serpents. Culture easy; succeeds in any cool position in gardens.

Laserpitium includes several fine, sturdy herbs; the foliage is sometimes 3-foliate (*L. panax*) and always decorative with massive umbels of white flowers majestically carried; grows in the alpine and mountain zone. *L. siler* and *latifolium* occasionally exceed 40 in. in height.

The Earlier Corollifloræ



There is little to claim attention in the Orders of this Class until we reach the Compositæ. One might almost think that nature was gathering her forces for the prodigal luxuriance of the coming jungle. Among the Valerianææ (an order characterised by opposite leaves, flowers in corymbose cymes or terminal glomerules, corolla inserted on the ovary, with a 3-5-lobed limb, and one to three stamens), the genus *Valeriana* is useful in a rough, blatant style for out of the way corners. The corolla is funnel-shaped with five lobes, and the calyx on maturity developes a pappus or feathery crest above the fruit; the stamens are three in number. The plant has a bitter taste and a strong scent and contains a principle which acts strongly on the nerves and is used as an antispasmodic, or a counteragent to epilepsy.

V. montana (Pl. XLIX) and *V. tripteris* (Pl. XLIX) are close akin. The stem leaves of the first are of a clear and shining green, entire, ovate-lanceolate, superficially toothed, flowers rose in a somewhat loose cyme. The leaves of *tripteris* are ashy-gray, heart-shaped, coarsely toothed, the cauline divided into three toothed segments, of which the terminal is by far the largest. Both species are found on cool, damp rock-slopes in our mountain districts.

V. salianca, found sporadically in the central Alps, forms dwarf, close tufts and bears flowers in small, dense capitules. The garden Valerian par excellence is *Centranthus ruber**, which, in three colours—pure white,

fiery red, rose—is most ornamental for rocks, walls, dry spots, sunny slopes, and flowers from June up to winter.

In the succeeding order, *Caprifoliaceæ*, there is one dainty plant whose wee loveliness endears it to alpinists, who seek to gather it in the Engadine and in the valleys of Saas, Anniviers, Turtman and Arolla, where it spreads carpets of exquisite green. This is *Linnæa borealis**. The long, running stems ramble over the ground, bearing rounded, opposite leaves, and throwing a multitude of little scapes terminated by a pair of nodding bell-flowers, white and rosy carmine within, sweet scented. It likes a shady, damp, almost boggy corner in sandy peat. The runners should be pegged down and topdressed with leafmould to promote the formation of new rootlets. Other showy members of the order are the coral-berried elder (*Sambucus racemosa*), *Lonicera alpigena*, *L. cærulea*, *L. nigra*, the three familiar Swiss mountain honey-suckles.

The typical plant of the *Dipsaceæ* is the Teazle, but for garden purposes its value consists in the Scabious, which plant, however, is only sparingly represented on high mountains. This genus is marked by a forked stem, bearing opposite leaves; the flowers are sessile or nearly so, in small heads surrounded by an involucre of many leaves; the four (or five-lobed) corolla is funnel-shaped. Somewhat similar but more coarse and massive is a roughly haired plant found in the limestone Alps and southern Jura, with large heads of yellow-ochre flowers (*Cephalaria alpina*). It at once attracts attention by its fine carriage; is easily cultivated and good for cutting, but hardly in place in a choice garden, despite a boldly ornamental aspect.



Compositæ



Nature in ordering her floral display has a prodigal habit of sacrificing quality to quantity; the larger the order, the fewer often, speaking comparatively, the number of high-bred beauties. Aristocracy and bourgeoisie are antipathetic. And the Compositæ are essentially a bourgeois wilderness. Even the *Aster*, *Arnica* and *Doronicum* have something blowsy or blatant to taint their unquestioned merits. *Leontopodium* is a practical joker; *Gnaphalium*, *Achillea*, *Centaurea* and *Hieracium* indecently prolific; the majority of the remainder weedy and utilitarian. For, to grant them their true value, many are excellent food-stuffs; for example the young roots or leaves of *Scorzonera*, *Salsafy*, *Lettuce*, *Chicory* or *Dandelion*. Others are medicinal, secreting, like all Compositæ or Synantheræ, a milky juice, usually bitter and resinous, occasionally narcotic. Wild *Chicory* is a laxative, the large-rooted variety also familiar in the truly bourgeois role of adulterant in coffee. *Lactuarium* a product of the poisonous *Lactuca* is celebrated as sedative and hypnotic—and the tale may be continued, a tale to be read in my volume *le Jardin de l'Herboriste*, except that a chapter should be added on the tonic value of *Elecampane* or *Inula*, whose root is sold in the Geneva market for its weight in gold. Even old *Horace* tells of it as the material of an aromatic sauce for lampreys. The characteristics of the order are : herbs, rarely shrubs and still more rarely trees, with leaves (except in *Arnica*) alternate and, as a rule, deepy cut, without stipules;

flowers in dense heads or capitules on a common receptacle enclosed in an involucre attached to its walls ; calyx generally scaly and membranous ; corolla gamopetalous, inserted on the top of the calyx-tube, sometimes tubular, more or less regular, with five lobes or teeth, sometimes divided for the greater portion of the length into a flat strap, notched at the tip. In many species, the *Marguerite* for example, the inflorescence takes the form of a yellow disk of central florets, surrounded by a wreath of others in the form of white tongues.

Adenostyles

These are stout growing plants with large triangular leaves, generally white underneath, and big, flat, fluffy heads (compound corymbs) of numerous, small, few-flowered capitules ; the corollas are pinkish purple, funnel-shaped, and five-toothed, with four stamens. Both *albifrons* and *alpina* are fine plants of wilder parts of the garden, and may be propagated from seed or by division.

A. albifrons (Pl. L.) A robust plant with very broad, somewhat heart-shaped leaves, irregularly toothed and ashen coloured, with a fine tomentum on the underside ; stem at least 40 in., bearing a large corymb of flowers in small clusters of 3-6-flowered capitules. June-September. In the neighbourhood of Bourg-Saint-Pierre I have found a variety with white flowers. Moist places in mountainous and subalpine districts (1000-1800 m.).

A. alpina is distinguished by its somewhat triangular and more elongated leaves, which are glabrous on both sides, and by a stem not exceeding 20 in. Flowers (July-August) in cool rocks in the subalpine region of the Alps and Jura.

A. leucophylla has white leaves, tomentose on both sides; 10-20-flowered capitules, forming a compact cluster, violet-rose, fragrant. This variety does not exceed 16-20 in., and forms compact tufts in stony heaps at high altitudes.

Homogyne

H. alpina (Pl. LI). A small creeping plant, with somewhat circular leaves of dark evergreen, glistening above, pale below; flowers reddish, all tubular, in a solitary capitule. July-August. Cool alpine and sub-alpine pastures. It succeeds well under cultivation in rockeries, given a northward or partly shaded position, and may be easily grown from seed, but is not often seen in gardens, having no really striking merit.

Petasites

Eng.: Butter-bur; *Fr.*: Tussilage; *Ger.*: Pestwurz.

A fine and striking plant closely allied to *Homogyne*, *H. alpina* formerly being known as *P. alpinus*, with a stout and aggressive rootstock, and therefore to be treated with due caution. The hollow stem is covered with narrow, lanceolate scales and carries an oblong raceme of numerous heads. A peculiarity of the plant is the fact that the leaves appear after the flowers. Only to be used in wild and bare places.

P. niveus (known in the Swiss mountains as "Contre-pesté" or "Herbe aux teigneux," on account of a reputed power to cure scurf in children) is a stout plant; the leaves are broad, slightly triangular and not unlike Rhubarb, with toothed edges, white, tomentose beneath, and expand towards maturity; stems 8-20 in., erect before and drooping after inflorescence, bearing spikes

of white flowers in numerous, close-set capitules. It is the first flower to appear in moist places and beside streams after the snow melts, keeping company with the small *Crocus* and *Soldanella*.

P. albus differs from the above in the roundish heart-like outline of the leaves which are a little angular and white to greyish below, while the flowers are yellowish-white. April-May. Moist copses on all Swiss mountains.

Aster

Eng.: Aster; Fr.: Marguerite de montagne or Chamois bleu;
Ger.: Sternblume.

The magnificent mountain Daisies are of the easiest cultivation in any warm, sandy soil. But their superb magnificence deserves better than the careless neglect which their obliging disposition too often invites. They are apt to grow out of the ground leaving the stalk bare and a plaything to the wind; this must be met by due precautions, of which a spring top-dressing is the best. *Alpinus* in cultivation may grow coarse and throw flowers of unnatural size; it is all the better for a little starvation. Nor should one be led to plant it in too sunny a place, because it is a child of sun-baked alpine slopes. In our lowlands it welcomes some protection from extreme heat. Other true and indispensable alpins are *acris*, *amellus* (of which many fine hybrids have been raised), and the Himalayan *diplostephioides*. The common garden Michaelmas Daisies are of American origin and need much more liberal treatment. Both groups, however, require fairly frequent division. The characteristics are an involucre, whose imbricated bracts suggest overlapping roof tiles; disk-flowers with five teeth; ray flowers strap-like and radiating like those of a Daisy.

A. alpinus (Pl. LI). A tufted greyish-green plant; leaves entire, obtuse, hairy; stem 4-8 in., bearing one large, solitary capitule, with ligules of violet-blue surrounding a golden-yellow disk. Flowers from July to September on all sunny Swiss mountain slopes. At Floraire several forms are grown, including varieties with white, rose or reddish flowers, some varieties having large flowers or even multi-capitate stems.

A. amellus, a native of dry limestone hillsides, has a branching stem, capitules in varying number, small, with bright violet ray-flowers and a golden disk. Flowers in autumn.

Bellidiastrum

B. Michellii (Pl. LII). This is the large daisy that is so common on all moist slopes in our mountains and is popularly named in Swiss countries "The false Daisy". The leaves are ovate, toothed; the flowers, resembling small, nodding daisies, are white, turning to rose later. Its chief merit is the prolonged season of flowering. Propagated by seed and division.

Erigeron

Eng. : Flea-Bane ; *Fr.* : Vergerette ; *Ger.* : Berufungskraut.

This genus is closely akin to the Aster, from which it differs in more numerous ray-flowers, which are many-seriate, either all very narrow and ligulate or forming small filiform tubes on the inner rank. *Alpinus* is but a poor caricature of its noble cousin and is altogether unworthy of cultivation. For good varieties one must go to Central Asia for *aurantiacus*, *multiradiatus*, or to North America for *glabellus*, *salsuginosus*, *speciosus*, etc.

*E. alpinus** (Pl. LII). Most usually covered with hairs; flowers in fairly broad heads, the ligules very

slender, rosy-purple, twice as long as the pale yellow disk. Alps and Jura, on dry, rocky pastures. (1000-2000 m.).

E. uniflorus differs in its more hairy character, short and seldom branched stem, woolly involucre, and clear lilac ray-flowers. July-August. Alpine pastures. (1900-2500 m.).

E. glabratus differs from *alpinus* in a stem glabrous for all the length, leaves simply ciliate, and female disk-flowers very few.

E. neglectus differs from *uniflorus* in its rosy ligules, very short radical leaves, longer and slender stem, and reddish capitular bracts. Eastern limestone Alps.

E. Villarsii is a sturdy plant, viscous, with numerous glands and large capitules. The stem is much branched and may reach 16 in.; the branches carry 1-3 heads of rosy violet. July-August. The alpine region of the Alps.

Gnaphalium

Eng.: Cud-Weed; Fr.: Gnaphale, Immortelle, Cotonnière;
Ger.: Ruhrkraut.

This genus is a fine instance of the confusion which has overtaken garden nomenclature. *G. arenarium*, a poor thing, is now a *Helichrysum*, *G. dioicum* and *carpathicum* are handed over to *Antennaria*, and *G. Leontopodium* is the Edelweiss, *L. alpinum*. The French names are happy descriptions of the white, woolly foliage, and everlasting flowers. The leaves are entire, the involucre consists of imbricated, adpressed, semi-transparent bracts, with 2-3-seriate female flowers.

*G. dioicum** (Pl. LIII). Forms large tufts of dwarf, silver-grey foliage; flowers many, white, rose or carmine, in compact simple corymbs, persistent because of the

scarious involucre bracts, and consequently preserved like Everlastings. In male individuals the capitule is rounded and short, in female narrow and elongate. May-July. It is a popular plant with gardeners who employ it for artificial border-work and even for the abominations known as carpet-bedding. Swiss mountaineers call it popularly cat's-foot, and gather it for use as a vulnerary and as a cure for coughs.

G. carpathicum. Stem not stoloniferous; leaves not unlike those of Edelweiss, but green above and tomentose below; stem 2-6 in., simple, cottony, with 3-6 heads of dingy white in a compact corymb. Alpine escarpments (1800-2300 m.) in non-calcareous soil.

G. supinum is the very minute, grey-green herb, with dingy white flowers in a small, short, close raceme, whose densely cæspitose sheets are so abundant in the snowy pastures of the granitic Alps. (1500-2200 m.).

Leontopodium

L. alpinum (Pl. LIII). It is unnecessary here to describe the Edelweiss, the most familiar of our alpine flora. It is sufficient to say that the flowers are insignificant and yellowish, the whole secret of its beauty being the star-like collarette or involucre which supports the flower as though in a silver cup. Thanks to the densely tomentose character of this involucre the flower does not wither and furnishes an alpine everlasting dear to the tourist's heart. Since French tongues mangle the German name I suggested twenty four years ago (*le Jardin*, 1887, p. 16) "Étoile d'argent" or "du glacier" as a French name for this flower. My neologism appears to have become common, and it were desirable that it should continue. Swiss mountaineers call it "Belle Etoile".

It is a common mistake to regard the Edelweiss as peculiar to Switzerland and the Alps. It is found on the Himalaya, in Siberia, Japan and China. It can only be this mistaken idea and the general sentiment that has so undeservedly attached itself to a plant, no doubt beautiful enough in itself but with no claims to be the typical alpine of alpinists, which has given rise to a superstition that the cultivation is difficult. As a matter of fact it can be raised with the greatest ease from seed, and nothing but winter wet can kill it. Like all other woolly plants it must be kept perfectly dry during the cold damp season and should be planted sideways on a slope packed among protecting stones in very gritty, calcareous soil. Annual division is advisable. As the removal of mountain specimens is unwise and difficult of success, it is well to raise seedlings or procure established roots. To preserve the characteristic white tint of the involucre, nothing, so far as my experience goes, is equal to an admixture of mortar rubbish in the soil where it grows. Occasionally Edelweiss may be seen to attain extraordinary dimensions under cultivation; the effect, however, is neither true nor beautiful; far preferable is it to preserve the natural character and freshness. Therefore give it poor soil. At *Floraire* we have very delightful examples growing in the chinks of a chalk wall, facing full south, or even in pots, where it is grown for exportation. Perfect whiteness is always secured and by this treatment remains unchanged in a chalky soil.

Artemisia

Eng.: Wormwood; *Fr.*: Armoise, Artémise; *Ger.*: Beifuss.

The Wormwoods are to be recognised by the small globular heads, in racemes or panicles, of tubular flowers, the outer three-toothed, the inner five-toothed. They are somewhat shrubby plants with finely cut, whitish

foliage, pungent to the taste and very aromatic. Like many other high mountaineers they are woolly and require a warm sunny place, high up and well drained, in limestone and coarse loam. Speaking generally the treatment suggested for *Leontopodium* will answer. *A. glacialis* is perhaps best worth growing, the others being somewhat weedy, though the silver gray foliage of all is charming.

A. mutellina (Pl. LIV). Strongly aromatic; silky silver-grey, the leaves very deeply-partite into narrow, lanceolate divisions; flowers yellowish, in a less than 20-headed, erect, oblong capitule, forming as a whole a very loose and straggling raceme. Glacier moraines (1800-2200 m.). July-August.

A. spicata. Leaves less deeply cut, more silvery grey; flowers (12-15) in more rounded heads; perfume less acrid and more resinous; particularly distinguished by the arrangement of capitules in narrow spikes, bracteate to the top. This is the true Alpine Genipi, from which the celebrated liqueur of the Valdotains is made.

A. glacialis (Pl. LIV). Forms the tufts of fine, silvery foliage, which spread in broad carpets over the dry slopes of the Pennines, and are covered in July-August with beautiful golden-yellow spikes. Leaves very finely partite, silky, silvered; stems 4-6 in., erect, with compact, terminal corymbose inflorescence of beautiful yellow.

These three Wormwoods are in great request among the natives of the Alps, at Chamonix, in the valley of Aosta and the Grisons, where the refined and stomachic liqueur is distilled from them, which is called variously G n pi, G n pi, Gin pi, or in the Engadine Iva. Report says that they enter into the composition of Chartreuse. They are also energetic reagents. In case of catching

cold in the high Alps the liquor from a few boiled leaves drunk while hot acts like a charm. The poison Absinthe is distilled from *A. absinthium*, common on dry slopes of the granitic Alps.

Dans le calme désert des Alpes souveraines,
 Au sein des rocs brisés, sur les hauteurs sereines,
 Près du sommet glacé,
 Fleurit l'Armoise aux fins épis d'or pâle;
 L'arome exquis que son feuillage exhale
 Ranime un cœur lassé.

G. BEAUVERD.

Achillea

Eng.: Yarrow; Fr.: Achillée; Ger.: Schafgarbe.

The eponymous hero of this genus has not, so far as garden value goes, been honoured in his namesakes, for in the alpine *Achilleas* that aristocratic stamp of dwarf and compact neatness which is so marked a characteristic of plants from high elevations is far to seek. The fine jagged silver of Austrian *Clavennæ* and the prostrate snow sheet of Italian *rupestris* are valuable in carpet work or for edgings; these with *moschata*, the Grecian *ageratifolia* and *umbellata* and the Balkan *serbica* will suffice for an alpine garden. The fernlike foliage and yellow corymbs of *tomentosa* do well in the forefront of a border and *Ptarmica** is excellent for cutting. But most are coarse, leggy weeds. In fact all have a tendency to become lank, which must be thwarted by poor, sandy soil, frequent division and replanting, and periodic dressings of grit. The usual precautions advised for downy genera are necessary. The genus is distinguished by tubular ray-flowers, the disk-flowers, in one rank, being ligulate with rounded tips to the blades; the capitules are small, in corymbs which may be either compact or loose. They

contain a bitter essence which gives off a pungent perfume; taken in small doses, they are cordial and febrifuges.

In Swiss districts three dwarf, low-growing, grassy species are found, which occasionally spread into wide carpets of greenery : *A. moschata* (which on account of the strong *Artemisia*-like scent is used in the manufacture of Genipi) with greyish-green leaves, pectinate-pinnatifid; flowers a hard white in smallish heads, but bordered with broad ligules and arranged in 5-7 in a loose corymb; grows on rocky pastures of the granitic Alps (1800-2500 m.); *A. atrata*, distinguished by leaves of dark green, more rounded in contour, the segments being larger and divided into three strap-like sections (in *moschata* the segments are commonly entire); flowers larger and dingier, those of the disk blackish-purple; rocky pastures of calcareous Alps (1600-2200 m.); *A. nana*, a silky, tomentose and strongly aromatic plant, with narrow leaves, finely divided into thin ligulate segments, very hairy; flowers dingy white in compact corymb; glacier moraines and highest alpine pastures (1800-2500 m.), where it forms broad cæspitose sheets of sward; an infusion is taken alike against chills and sudden indispositions.

A. microphylla is found in moist copses and on banks of streams in the alpine and sub-alpine region. It is a strong plant, the large leaves of ovate outline deeply cut in lanceolate, irregularly toothed, dark green segments; stem 20 in.-2 $\frac{1}{2}$ ft., erect, with large head of white flowers. July-September.

Leucanthemum

L. (Chrysanthemum) alpinum (Pl. LV.). The little daisy with very deeply cut leaves, which makes small

tufts of bright green, with comparatively large capitules rising from hoary little stems, 3-4 in.; found on alpine rocks and moraines. It is a useful plant, on a well drained slope facing south, in very sandy loam. A spring topdressing will often save it from being lost, especially if firmly pressed back into the soil, from which it is apt to lift itself.

Aronicum

These natives of the highest Alps, from dripping rocky slopes and desolate moraines are near akin to the better known and worthier *Arnica*, except that the leaves are alternate, soft and ephemeral. The involucre is in two ranks, with equal flaunting bracts; the flowers clear yellow, the ray ones large in one rank. Robust, but not easy and hardly worth growing.

A. scorpioides (Pl. LV). Rootstock nodose; stem 8-12 in., 2-3-capitate; leaves dentate; capitule large, yellow, resembling a beautiful golden daisy. July-September. Rocky detritus of the Alps, especially the calcareous. 1500-2000 m.

A. Clusii and *glaciale* differ from the above, the first by its thin, ovate or oblong leaves, a 1-flowered stem bearing one large capitule of most brilliant yellow, the second by stiff, fleshy leaves and hollow stem.

Arnica

This great rough mountaineer with ragged stars of orange rising from a soft rosette of silky leaves is generally reputed to be difficult in cultivation, yet it is reported by some to be as easy as a daisy if abundant room in almost pure peat is provided for the wide ranging strap-like roots. A pale sulphur variety is even

finer than the type. The American, *A. Chamissonis*, is exceptionally easy.

A. montana (Pl. LVI). Aromatic; leaves opposite, ovate, oblong, the radical in rosettes close to the ground; flowers in 1-3 capitules, large, orange-yellow. July-August. Pastures of the Alps, rare in the Jura. One of the most generally used officinal plants; all portions contain Arnicine, and the flowers or leaves, after drying, are employed as stimulants, sudorifics, vulneraries or antirheumatics. In some districts they are smoked instead of tobacco.

Senecio

Eng.: Groundsel, Ragwort; *Fr.*: Seneçon; *Ger.*: Kreuzkraut.

The indispensable members of this group are *S. Doronicum*, whose vivid orange disks contrast so gloriously with the filmy silver of leaves and stem, the somewhat dwarfer but not dissimilar *aurantiacus*, with finer leaves and less startling flowers, the prostrate *incanus* and certain non-Europeans, *pulcher* from Uruguay, of doubtful hardiness but distinct with rosy flowers, and the grand novelties from China, *S. Clivorum*, *speciosus*, *Wilsonianus*, of which the first and third are bold, sturdy growers, 3-5 ft. high, and magnificent in damp, partly shaded places by the water side; *speciosus* is a dwarf with beautiful rose flowers. The alpine love sunny, dry banks in sandy loam and leaf-mould, under the shelter of a low rock face. They are easily grown from seed and very hard to kill by any neglect. The characteristics of the genus are:—involucral bracts in one rank, seldom all tubular, capitules generally corymbose, but rarely solitary.

S. Doronicum (Pl. LVII). Covered with a light, woolly down, which falls on maturity; leaves thick,

dentate, lower elliptic, upper oblong; stem 12-20 in.; capitules 1-3, bright yellow. July-August. Rocky mountain pastures.

S. aurantiacus. Plant with cobwebby nap; lower leaves ovate, oblong, faintly crenate, upper entire; flowers saffron in 2-8 capitules forming an erect corymb on a stem 8-12 in. July. Limestone Alps, 1300-1600 m. Rare.

S. cordifolius. The fine, sturdy, high-coloured plant, whose glorious golden panicles brighten the neighbourhood of alpine chalets between 1300-1600 m. Lower leaves cordate-ovate, serrate, slightly grey below. Stem 20-30 in., bearing (July-August-October) a large panicle of small, bright-yellow capitules. To be grown in partial shade, in a cool situation. *S. Jacquinianus* and *Fuchsii* are tall plants, over 40 in. high, with narrow, clear-green leaves, and innumerable small, yellow capitules in an open panicle. Gorges and cool mountain places. June-September.

S. abrotanifolius. Leaves glabrous, dark green, the lower finely bipinnate with elongated, linear segments; flowers fiery scarlet orange in rather large capitules, forming a loose corymb. Central limestone Alps and Grisons; 1200-1600 m. Adapted for rockery, in light, well drained soil, partial sun.

S. incanus (Pl. LVII). Small, tomentose plant, with ovate, toothed leaves, forming a low tuft; flowers yellow, rather few, capitules in a somewhat lax corymb. Granitic Alps, in dry pastures of the higher zone.

S. uniflorus, which is found in the higher Pennines, is to be distinguished by leaves of a deader white and less deeply toothed, by the solitary capitule on the stem, by the larger flowers of orange-yellow, *S. carniolicus*, a

native of the central and eastern High-Alps, has leaves of a dark green tinged with grey, almost silky, moderately toothed and elongate. The three last species, all very similar, may be grown in a dry, sunny crevice with cool, porous soil, but *incanus* only is needed.

Carlina

Eng. : Carlina-Thistle; *Fr.* : Chardon d'Argent; *Ger.* : Eberwurz.

C. acaulis (Pl. LVIII). This is the beautiful silver-thistle that may be seen all the autumn through glistening on every sunny slope in the Swiss hills. Our peasant women fashion it into most becoming trimmings for their hats, since the scarious inner bracts, which form the circlet so characteristic of the flower, are persistent and practically everlasting. Legend has it that Charlemagne, whose name the plant bears, cured by its properties his soldiers of the plague in Africa. Natives of the Ormont valleys call it the "Fair weather Thistle", since the gigantic head closes on the approach of rain and does not reopen till the return of sun. The bitter and tonic properties are much used as a stimulant and a sudorific; the receptacle may be eaten like that of the Globe Artichoke, and some profess to find the flavour very delicate. Haller says that it is a regular dish among the Vaudois highlanders and that he did not find it unpleasant.

A valuable plant for rockeries and pleasure gardens. Any rather shallow soil will do, but it thrives best in arid sand, where it will brighten the garden with noble silver flowers which last until the winter. The silver tone is improved, as in Edelweiss, by finely broken limestone, but, above all, the soil should be as poor as possible, else the true character is completely destroyed.

Centaurea

Eng.: Knapweed; Fr.: Centaurée; Ger.: Flockenblume.

One of the many Compositæ that figure so largely in dealers' catalogues and are unworthy of place in any except the wildest and roughest corners. The involucral bracts are dilated into appendages which are sometimes scarious, sometimes spinous, sometimes foliate; the outer florets are usually sterile, large and radiate.

C. montana (Pl. LIX). Cottony, with large, soft leaves; massive "corn-flowers". June-September. All rich or rocky mountain pastures. There are varieties with white, rose, red, or yellowish flowers, and all are to be grown with the greatest ease; in fact they rapidly become a nuisance in gardens.

C. axillaris is found in Ticino and at Belalp (Valais); leaves sinuate-dentate, flowers smaller, involucral bracts fringed.

C. nervosa. Lower leaves entire, upper strongly toothed, greyish-green; stem hardly ever branched; capitule very large, rosy-purple. July-August. Alpine meadows.

Crepis

Another composite which may attract the collector, but is useless to the gardener.

C. aurea (Pl. LX). Akin to the Dandelion, and found on cool mountain grassland. The orange-brown capitules at once attract attention.

C. grandiflora. A plant of sombre green; leaves pubescent, glandular, flowers in big, vivid-yellow heads arranged by 3-8 on the upper part of stems 4-20 in. high. Alpine pastures. Summer-flowering.

C. montana. Leaves unequally toothed; flowers clear yellow on stem of 16 in., which is thickened towards the head. July-August. Grassy slopes of the alpine zone.

In *C. alpestris* the capitules are smaller, the stems more slender and hardly thickened toward the head, and the leaves more regularly cut. Alpine or subalpine.

Lastly mention must be made of *C. pygmæa*, a small, creeping plant with cordiform leaves, shining white grey above, brownish below; flowers clear yellow in capitules, tinged with violet near the involucre; native of the higher peaks among debris. The tiny species *jubata* is rare in Switzerland. Leaves entire or slightly toothed; flowers golden-yellow; stem 1-2 in.; involucre very woolly. Found on a few desolate rock ridges of the high Alps.

Aposeris

A. fætida (Pl. LX). Resembles the Dandelion, but the leaves are more deeply divided into regular, triangular lobes; stem first erect, drooping after florescence. Shady places of limestone mountains. Not wanted in gardens.

Saussurea

*S. alpina**. A plant with running rootstock, grey, sinuate-dentate leaves, cottony below, bearing on a simple, leathery stem, 4-10 in., corymbose heads of small, bluish-purple thistle flowers, whose florets are entangled in cobwebby wool. Sporadic in moist alpine meadows; 2009-2500 m.

Mulgedium

Eng.: Sow-Thistle; Fr.: Laitron; Ger.: Milchlattich.

*M. alpinum** (Pl. LXI). Vigorous plant; stem erect, with glandular hairs, hollow, terminated by an oblong

raceme of close, viscid, blue-violet heads. July-September. Cool places in mountain districts. Up to 1700 m.

M. Plumieri, which grows on cool mountain limestone slopes, is distinguished by glabrous, slightly glaucous leaves, a stem absolutely glabrous and branching into a broad corymb of fine capitules of very beautiful, reddish-blue dandelion flowers. In its native home it grows about 3 ft. high, but will double this under cultivation.

The sow-thistles are perhaps the most effective of the coarser Compositæ but can, of course, only be grown in wild parts. Aridity and sun, or shade come alike to them and they will spread only too rampantly without attention.

Lactuca

L. perennis. Very glabrous, bluish, with leaves cut into toothed lobes; stem short, much branched, bearing loosely corymbose heads; flower heads numerous, large, reddish-blue, only opening in the sun and not unlike those of wild Chicory; I have found a variety with white flowers in the upper Queyras valley. April-September. Dry, stony, sunny places in mountains. To be treated as respectfully as *Mulgedium*, with which it is often confused.

Hypochæris

These are plants with yellow flowers in very large heads and are found here and there in the Alps. There are two different species. *H. uniflora* (*H. helvetica*); leaves oblong, toothed, larger than those of the Dandelion, less deeply cut, pubescent; stem hairy, the lower part leaved; one capitule, very large, yellow; higher pastures

of the granitic Alps. *H. maculata* or Porcelle differs from the above in that the leaves are often spotted with violet, the stem is shorter, with one or more large capitules; the involucre bracts very shortly ciliate. Mountain grassland.

Hieracium

Eng. : Hawkweed; *Fr.* : Epervière; *Ger.* : Habichtskraut.

This multitudinous and polymorphous family would require a volume to itself for complete description and even then, as perhaps might be expected, leave confusion worse confounded. But a special word of warning is here particularly needed, since firms of the highest repute as specialists in herbaceous borders continually attempt upon the strength of the peculiar coppery or sandy red tones found in these plants to foist them, especially *aurantiacus*, as desirable on the public. No more dangerous weed can get into a choice border, whose inmates it swamps under the close, ugly mat springing from the rambling stoloniferous roots, while self-sown seedlings spring up at surprising distances to make the evil endemic through the whole garden. *Aurantiacus*, it is true, with *Peletianum*, *pilosella* and *villosum*, is the most distinctive, but the wise will be content to use them to beautify old and crumbling walls in the open country. The species comprised are perennial (sadly so!), generally hairy, flowers varying shades of yellow, involucre of one or more ranks and imbricated.

H. aurantiacum (Pl. LXII). Stoloniferous plant, throwing numerous runners over the ground; leaves hairy; flowers bright orange, sometimes dark saffron, united into several close capitules, corymbose. July-August. Cool alpine pastures; somewhat rare.

H. villosum (Pl. LXII) is markedly different. Covered all over with long, woolly hairs; leaves bluish, oblong, undulate, capitules large, solitary, with bright yellow flowers. June-September. Rocky places in the limestone Alps and Jura.

Rhaponticum, *Cirsium*, etc.

Here and there, on steep and rocky alpine slopes, one meets a plant of great size, like a *Centaurea* with stiff stems. It reaches a height of more than 40 in.; the leaves are entire, greyish; the flowers rosy-carmine, in a very large head surrounded by an enormous, scarious involucre. This is *Rhaponticum scariosum* or *Centaurea Rhaponticum*, to be grown in deep and sunny garden soil.

Mention may also be made of certain Thistles, known under the names of *Cirsium* or *Carduus*; they are picturesque in growth and often beautiful. *Cirsium spinosissimum* is the pale-green species, with very numerous, spinous leaves, and stems 10-20 in. high, terminated by a dense cluster of pale-yellow heads surrounded by a spinous, yellow-green involucre. *C. Eriophorum* is the beautiful, majestic thistle with very large heads of dark rose, the involucre with woolly webs; found on pastures in the calcareous Alps and Jura.



Campanulaceæ



This order of herbaceous, rarely shrubby, plants takes its name from the bell-shaped corolla common in the typical genus, though funnel and tubular forms are also found; the limb or expanded portion is in all nine-cleft or less. The leaves are simple, alternate (seldom opposite) and without stipules; the flowers regular, in racemes or spikes or clusters of heads (glomerules), but occasionally also in panicles; the five-lobed calyx remains adherent even when withered; the stamens are six, usually free, and seldom united at the base of the corolla; the style is practically naked with two to five stigmas.

Many of the genera contain a milky juice, full of mucilage, which neutralizes their acrid principles and permits the roots of many (e. g. Rampion) to be used as food-stuffs.

Phyteuma

Eng.: Rampion; *Fr.*: Raiponce; *Ger.*: Rapunzel.

It is difficult to believe that the members of this genus are cousins of the Bell-flowers, when one looks at the curious heads or spikes of stalkless flowers, whose corolla is divided into five narrow parts, which join together again towards the top. As a race they are not easy to manage, particularly two of the best, *P. Scheuchzeri* and *pauciflorum* which should be well packed among limestone in a sunny and dry part of a rockery with a little stiff loam admixed, or in an old wall. Ample depth

for the tap-roots must be given and the neighbouring stones arranged to guard against winter damp. Frequent top-dressings are of advantage. The *P. orbiculare* from the downs of Hampshire and the Dalmatian *comosum* are also excellent kinds. *P. hemisphæricum* is more difficult and seldom successful, but hardly necessary where the better varieties are grown. Slugs are very partial to plants of the genus, eating out the crowns and so destroying all chance of bloom. Propagation by seed.

For the benefit of collectors the botanical description of the genus and the species found in the Alps is given :—

Corolla tubular before expansion, then opening from top to base in 5 linear segments; stigmas 2-3, filiform; capsule ovoid, opening by 2-3 longitudinal valves; stem simple; flowers small, in one solitary capitule or in a compact spike.

P. betonicaefolium (Pl. LXIII). Lower leaves lanceolate or cordate-lanceolate, on long petioles; scape erect, stiff, bearing one short spike, passing into an oval and then elongated; flowers blue, often with 1-2 bracts at the base. July-August. Dry, rocky alpine slopes.

P. scorzoneraefolium differs from it in glabrous or only ciliate leaves, the lower elongate, linear, imperceptibly narrowing towards the stem.

P. spicatum *. A widely spread plant, found in all wooded and mountainous parts of Switzerland; radical leaves cordate-ovate, crenate, toothed, often marked with a brown spot in the centre, upper leaves narrower; flowers close-set on a pyramidal or cylindrical spike, yellowish-white, rarely blue.

In *P. Halleri*, an alpine or subalpine species, the lower leaves are rounded, on long, slender petioles, the margins twice toothed; flowers very deep blue, in long, close spike, with two bracts at the base.

P. orbiculare * (Pl. LXIII). Stem 16-20 in., erect, stiff; leaves crenate-serrate, somewhat pubescent; flowers violet-blue, in globose capitules, with rounded-ovate bracts at the base. Abundant in meadows of all mountainous districts. May-July. Useful plant for cultivation in rockeries and borders; partial sun, light and rather cool soil. A white flowered variety which we had in cultivation has been lost.

P. Scheuchzeri is a glabrous evergreen; radical leaves ovate-oblong, margins serrate; upper leaves elongate, linear; stem erect, with a round head of close-set flowers, deep violet-blue, above a whorl of narrow, spreading or reflexed bracts, which are longer than the flowers. July-August. Rock-crevices in the central and eastern Alps. 1000-2200 m.

P. hemisphæricum (Pl. LXIV). Small, grassy plant; leaves graminiform, long, linear, numerous; stems slender, many, 2-6 in.; capitule of violet tinted blue, with ovate-lanceolate bracts. Summer flowering. Poor turf in the granitic Alps. 1500-2200 m. *P. humile* differs in its larger leaves, finer flowers, with bracts as long or often longer than the flowers. July-August. Eastern Alps. 2000-2700 m.

P. pauciflorum (Pl. LXIV). An altogether dwarf plant, forming small, low carpets of glabrous leaves, the upper part of the lamina enlarged, obovate; flowers blue, 5-7 on small heads. July-August. High, dry and rocky pastures of the Alps. 1500-2500 m.

Campanula

Eng.: Bell-flower; *Fr.*: Campanule; *Ger.*: Glockenblume.

To choose among Campanulas is a work of supererogation; the simplest and most satisfactory advice is that

none should be rejected, for very few will be a cause of disappointment as regards elegance and charm, nor many a trouble by exigences or caprice. Given light and air, and all will go well, if excessive damp is avoided and plenty of limestone provided, except for such granitic species as *Allioni*, *excisa* and *pulla*. In order to be effective the scheme of planting should be bold and generous, the taller varieties, of which *persicifolia* is the best, in the borders, and the dwarfer, among which *pulla* is the gem, to trail over and among rocky ledges. All the Swiss varieties are good, but no collection should omit the dainty but difficult *Allioni* from the western and southern Alps, *Raineri* from northern Italy, and *Zoysii* from Austria. A periodic division in autumn with liberal dressing of leaf-moned acts like a charm; it is difficult to imagine without seeing the difference made, to the taller varieties especially. Propagation by seed is ridiculously simple, and if some species, like *thyrsoides*, prove biennials, next spring is pretty certain to see an abundant crop of self-sown seedlings. A monograph on the culture was published in *The Garden*, June-October, 1910.

Description :— Calyx short with five narrow lobes, lanceolate or ovate; corolla five-lobed, bell-shaped; stamens free, with filaments dilated at the base; three thread-like stamens.

C. pusilla (Pl. LXIV). A low-growing, matted little plant, with longish oval and toothed lower leaves, and dainty racemes of handsome bells on slender, nodding 4-5 m. stems. June-October; mountain slopes, especially on chalk. The flowers are variable in colour, deep lilac-tinted blue in the type, and white in an altogether exquisite variety. Nothing seems to come amiss to this "most beautiful of all weeds," as it has been described; it is invaluable as a carpet or edging in borders, rockeries,

old walls, sunny or shady alike. Very gritty, moist loam.

*C. rotundifolia** or the common meadow "Hare-bell". Only the basal leaves are rounded, those on the many-branched, erect stem being linear or oblong, lance-shaped and entire. The charming violet-blue bells are carried on many-flowered racemes. Horticulturists have produced garden varieties of pure white, differing in size and fullness of bell. A magnificent blue variety is *soldanel-læflora fl. pleno*.

C. Scheuchzeri (linifolia) differs from the last in a shorter stem with linear, dentate leaves; in fewer but very large flowers (two or three only) of deeper violet blue. High alpine pastures in very wet ground. *C. Valdensis* is similar, except for a covering of greyish down.

C. rhomboidalis (Pl. LXV). A fairly strong grower, peculiar to rich and sunny meadows or high pastures. Lower leaves rounded ovals, crenate and slightly glandular; the upper longer and toothed; flowers deep blue, in narrow panicles. Mr. Farrer reports a variety of soft, very delicate, silvery blue from the Schwarzwald-gletscher near Rosenlauri. A white variety also exists.

C. barbata (Pl. LXV). Woolly; leaves oblong, in large rosettes spreading over the ground; flowers large, drooping, interior bearded, clear porcelain blue, lilac or white. All dry alpine pastures: 800-2000 m. Few plants are more accommodating as to soil, but it requires a sunny slope and may rot off in winter. Deserves to be more widely known.

*C. latifolia**. Tall plant, with milky sap; leaves ovate-lanceolate, roughly serrate, pubescent; stem hollow, stiff, unbranched, stout, 40-60 in.; flowers large, on a

long spike, erect, pale lilac-blue, lobes ciliate; calyx glabrous. Mountain woods. June-August.

C. persicifolia. A beautiful bell-flower nearly 40 in. high; flowers very large, deep glistening blue: corollas widely opened, in 2-6, on long, thin stems; leaves linear, crenate, finely serrate. Peculiar to wooded slopes in the warmer parts of Switzerland, and a wonderful ornament to the whole landscape. It succeeds in any soil that is not too heavy and in partial shade, but care must be taken to examine the basal rosettes, which are apt to lift and cause loss of root-hold. The variety *alba* is a charming foil to the type and *humosa* a splendid form with immense satiny bells and a double corolla.

C. cenisia. In the high parts of the Alps, on glacier moraines or in sunny heaps of earthy rubbish, one finds between 1800-2500 m. a dwarf, little campanula with recumbent stem, forming charming trusses of clear green foliage; the leaves are ovate, ciliate and rosulate; flowers are solitary, of medium size, greyish or Venetian blue of the shade sometimes called electric; the cups with 5-deeply cut lobes are flattish, widely opened and upturned. Madame Julia Correvon found in 1889 a delightful variety with pure white flowers on a moraine of the Valsorey glacier. It is rather difficult to establish in gardens, but once at home flowers profusely, even to death. The soil required may be described as artificial moraine, chiefly sand and grit. Winter damp and snails must be guarded against by a plentiful dressing of similar grit.

C. excisa is a curiously beautiful native of the granite from among the Simplon group and near Belalp. It gets its name from the small and perfectly rounded hole by which the lobes of the corolla are divided as if by a punch. This small, delicate, grasslike campanula with thin, airy

wires of stems recalls *pusilla* but it is altogether slighter in build, and the foliage narrower and more linear. 2000-2800 m. A hater of lime.

C. thyrsoides (Pl. LXVI). One of the gems of alpine campanulas. Leaves woolly, in broad rosettes ; from the centre around the stiff, hollow, thick scape, rise a compact spike of very many, yellow, fragrant flowers with a hairy corolla. July-August. Rocks of the limestone Alps and Jura. To be grown in deep soil, rich in humus, and exposed to the sun. The plant dies after flowering, but produces self-sown seedlings freely. *C. spicata* in a granitic counterpart with blue flowers.



Vaccineæ



This order of small and almost glabrous shrubs contains several plants, which, if not of first-rate merit, must be acknowledged at least ornamental; the many-branched roots are wide foragers and stoloniferous; the regular flowers consist of a calyx with four or five teeth, and a one-petalled corolla, whose five lobes alternate with the teeth of the calyx; the stamens number five or ten; the single style carries a blunted stigma; the fruit is a fleshy berry.

Vaccinium

Small sub-shrubs, forming low, spreading bushes; the leaves, which are carried on short stalks, are either evergreen or deciduous; the urn or bell-shaped flowers hang downwards on short peduncles, either solitary or in clusters. They should be planted in peaty soil, with somewhat of permanent moisture, and partially shaded. Propagation by cuttings or seeds, though the latter is a very slow process.

*V. Myrtillus** (Pl. LXVII). *Eng.*: Bilberry; *Fr.*: Myrtille, Embresaille, etc.; *Ger.*: Heidelbeere.

A familiar shrub, with semi-prostrate branches spreading among moss or soft turf; stem angular, with deciduous, toothed leaves; flowers reddish, solitary. The blue-black fruit is much esteemed by our thrifty housewives, who use it for many purposes, for desert, or stewing,

or preserving or making into really excellent sirops and fermented drinks. It has a cooling effect and is considered a specific against diarrhœa or dysenteric attacks.

V. uliginosum * (Pl. LXVII). *Eng.* : Wortleberry; *Fr.* : Airelle bleue, Orcette; *Ger.* : Moorbeere.

Small shrub with grey, wooded branches, which carry leaves towards their tip but are naked below; leaves deciduous, ovate, wrinkled and bluish underneath; flowers small, pale pink, in drooping racemes, followed by bluish berries, which are edible but injurious if taken in any large amount.

V. Vitis Idæa * (Pl. LXVIII). *Eng.* : Cowberry; *Fr.* : Airelle rouge; *Ger.* : Preiselbeere.

Small tufted shrub, like a trailing box; leaves evergreen, ovate, of a beautiful shining green; flowers small, white or clear pink, in nodding racemes; berries hard, bright red, edible. June-August. Shady mountain peat. The fruit is much used, especially in Germany, for stews, sirops and pastry. Wine too can be made of it.



Ericaceæ



Shrubs or sub-shrubs with abundant leaves; leaves simple, alternate, opposite or in whorls, small, almost always evergreen; flowers regular or nearly so; calyx persistent, 4-5-fid; corolla monopetalous, 4-5-lobed or toothed; stamens 5, 8 or 10, with 2 tubular tips; style 1, filiform.

Erica

Eng.: Heath; *Fr.*: Bruyère; *Ger.*: Heide.

The rock garden is an ideal position for Heaths, which are as accommodating as they are charming. Given very sandy well-drained peat they will look after themselves, but a certain amount of moisture is necessary and therefore a level position is best. As with all plants of this order seedlings are very slow in reaching maturity. Switzerland is not rich in this genus, but a Swiss Heath, *E. carnea*, is one of the parents of a magnificent hybrid, *E. hybrida*, which every one should possess for the sake of a January sheet of bloom.

*E. cinerea**, in various shades, is also most desirable. Characteristics are a calyx with five coloured divisions; a tubular, four-cleft corolla, and eight stamens.

Switzerland has two Heaths; one, *Erica* or *Calluna vulgaris** (Ling), is the small, tufted shrub which is our most beautiful autumn mountain ornament. Branches many; leaves minute, evergreen; calyx membranous, persistent; inflorescence pink, spiked. July-August.

The other, *E. carnea*, is known in Romance Switzerland as Bruyère d'Ollon. A small, trailing bush; branches ascendent, furnished above with small, linear, evergreen, needle-shaped leaves, dark green in colour; numerous vivid pink flowers with long tubes, in terminal spikes. Flowers in early spring, after the melting of the snow. Both the type and a variety with white flowers are alike charming and favourite garden plants, flowering as early as January. Requires full sun and light soil.

Azalea or Loiseleuria

A. procumbens. A trailing, miniature shrub, with depressed branches, covering in the high alpine zone (1500-2700 m.) vast areas with tufts of shining, reddish foliage. Leaves numerous, small, ovate, margins revolute, lasting through winter; flowers small, bright rose, 2-4 in subcorymbose clusters. July-August.

Arctostaphylos

Eng.: Bear-berry; *Fr.*: Arbousier; *Ger.*: Bärentraube.

The neat habit and elegant box-like foliage of these plants makes them admirably suited for rockeries in peaty loam. A further recommendation is that the leaves are usually evergreen and the berries of the most ornamental species (*A. Nevadensis* and *A. Uva Ursi*) remain on the plant till winter. Both are very easy and do well in any soil. *A. alpina* does best on margins of boggy land. They are distinguished by the five divisions of the calyx and of the corolla, the latter of which is globular with reflexed lobes; the stamens number ten; the berry is globular.

A. Uva Ursi (Pl. LXVIII). Low shrub, with long, divided branches, trailing as much as 40 in. along the ground; leaves ovate, thick, leathery, dark shining green; flowers small, clear pink, in a short raceme; berry round, bright red. Common in the Alps and Jura; rocky, sunny places. It is a fine plant for rockwork and alpine gardening, suitable for dry banks and similar situations. Medicinally it is astringent.

*A. alpina** differs in deciduous leaves, which turn to red in autumn and then wither; they are toothed, with netted nerves, pale beneath, ciliate at the base; flowers small, white; the large jet-black berries are quite distinct. Alpine zone from 1500-2000 m.

Rhododendron

Eng.: Rhododendron; Fr.: Rosage, Laurier des Alpes;
Ger.: Alpenrose.

No words of recommendation are needed for these charming shrubs. The dogged perseverance of their slow growth, their utter hardiness, and the vivid splendour of their flowers are all marks of the truest Alpine. Yet by a somewhat paradoxical perversity, while they succeed readily in England, in Swiss gardens they are almost untractable, though once acclimatised in the lowlands all goes well. Both the white and pink varieties of *hirsutum* and *ferrugineum* which fill one of the *Floraire* borders were raised in England. No garden should omit the delightful dwarf from Tyrol, *R. Chamæcistus*, with exquisite cups of rosy purple and a good doer in limestone fissures, packed with sandy peat. The Asiatic *racemosum* (light pink) and *Kamschatcicum* (deep crimson) are also essential.

The characteristics and Swiss representatives of the genus are :—

Shrubby; the branches leafy at the top; leaves coriaceous, entire, persistent; flowers in very short racemes; calyx 5-fid or 5-toothed, the teeth sometimes very small; corolla 5-toothed, funnel-shaped; stamens 10.

R. ferrugineum (Pl. LXIX). Shrub 20-40 in.; branches many, woody, twisted, black-brown; leaves ovate, deep green above, rusty brown below; flowers brilliant carmine, in short racemes. Occasionally a white-flowered example is met. Alps and southern Jura. 800-2000 m. July-August.

R. hirsutum. Native of the northern and eastern Alps, from the Vaudois group to the Sentis; leaves shining green, marginally ciliate; flowers larger and of clearer pink than in the preceding. 700-2500 m.

The Rhododendron is, as Rambert says, the alpine plant par excellence. Not only does it not exist in the surrounding plains, but nothing like to it is found there. Not merely the species, but the whole genus is alpine. The first bush of it marks an event in each excursion; a moment sees it robbed and bare, to grace button-holes or hats or bodice. Free child of the mountain, drinking through every pore that brisk and tonic air which quickens the blood and banishes gnawing thoughts, is there not some mysterious harmony between thy flowering shrub, all radiant with health and light, and the ringing peasant jodel, echoing from hill to hill, which feeble lungs or downcast hearts could never learn to utter?

M. le Dr. Hermann Christ, in his remarkable work *Flore de la Suisse*, has written an excellent and scholarly account of these two Swiss Rhododendrons. Nor is it possible to speak of these plants without calling to mind

the charming verses of the Vaudois poet H. Durand, entitled *la Rose sans épines* :—

Sur nos rochers se cache un doux trésor,
Qu'en vain ailleurs cherchent les hommes ;
Plus haut en prix que l'argent et que l'or,
Il ne se vend pas pour des sommes.
Est-ce une mine, un puits à découvrir,
De diamants, de perles fines ?
Non ! le soleil la voit croître et fleurir,
C'est une rose sans épines.

Medicinally considered, they are in request among our mountaineers, who take infusions of the leaves and flowers for rheumatism, herpes and skin complaints. They are also used in the composition of *thé Suisse* or *de Glaris*.



Pyrolaceæ



Natives of mossy woods ; stems stoloniferous ; flowers regular ; calyx persistent, with five sepals united at base ; petals five, free ; stamens ten, in two ranks ; style single.

Pyrola

Eng.: Wintergreen ; *Fr.*: Pyrole ; *Ger.*: Birnkraut.

All the *Pyrolas*, which are plants with characteristics identical with those given for the order, are natives of woods and reedy places, especially among the mosses growing about the foot of pine trees.

P. rotundifolia and a beautiful rosy counterpart, *P. incarnata* from the Rockies, are easy, given well rooted plants, in sandy peat or leaf soil. Unfortunately the most delicate, *P. uniflora*, is not so kindly in disposition. It is unnecessary to add that cool root moisture and shade are essential. They should be propagated by cuttings, for it is not easy to raise seedlings.

*P. uniflora** (Pl. LXX). Low plant with trailing, subterranean stem ; leaves clear green, weakly crenate ; flower solitary, large, wax-white, with delicate scent of oranges. July-August.

Dans la mousse et sous les sapins
Où se cache ta fleur de cire.
Bien souvent j'accorde ma lyre
Pour chanter tes charmes divins.

De ta grande corolle blanche
Le parfum grise mon cerveau;
Et je lis un chant tout nouveau
Dans le sein de ta fleur qui penche.

Dans le fond du bois protecteur
Vis en paix, *Pyrole* uniflore,
Et que jamais nul ne déflöre
Ton innocence et ta candeur.

*P. rotundifolia** (Pl. LXX) or "Faux muguet". Forms large trusses of noble and severe green, enhanced in July and August by beautiful racemes of rosy white flowers which are faintly perfumed and remind one slightly of lilies of the valley (muguet). *P. secunda** (Pl. LXX), differs from it in ovate, acuminate leaves, small, greenish flowers.



Primulaceæ



Herbaceous plants; leaves simple, generally entire, exstipulate; flowers usually regular; calyx persistent, with four to five divisions: corolla monopetalous, four- to five-lobed; stamens inserted on the corolla-tube, in number equal to the lobes; style single. The roots contain a peculiar constituent, which gives them a strong scent of anise.

Primula

A genus, only second, perhaps, to the Saxifrages in value and, alas, second also in confusion of nomenclature. Some one hundred and fifty mountain species have found a place in gardens and the number grows almost daily with introductions from hitherto unexplored areas of central Asia; of almost every species, too, are many forms and varieties. Needless to say, the constitution and requirements vary widely; some are sun lovers — generally those with leathery rather than viscid foliage — some lovers of partial shade or bogs. Some require peat, some lime, some sandier material; but sound loam with plenty of broken stones suits most. For like all true rock plants they are deep rooters and must have deep crevices in which to bury their immense thongs. Like many other alpinses with similar root structure they are very apt to lift during frost, and neglect to remedy such an accident may easily be fatal. Propagation by seed is slow, though sure, but absolute truth to kind

must not be expected from garden grown seed, since cross fertilisation is almost more the rule than the exception. Seedlings should be planted in permanent quarters as soon as may be. The variability of requirement make it necessary to give brief cultural notes to each species, rather than attempt to deal collectively with the subject. Nor is it possible in this work to make a selection from the Chinese, Himalayan or other such novelties. The characteristics are a five-toothed calyx; a long, funnel-shaped corolla, with five-lobed limb, usually emarginate.

P. elatior * (Pl. LXXI) : the "Bardfield" Oxlip and parent of the garden Polyanthus, probably a natural hybrid between *officinalis* and *acaulis*. This is the beautiful pale yellow species, with large flowers in umbels, which is found on moist and shady mountain slopes, where it flowers in the first days which follow the disappearance of the snows.

P. officinalis (Pl. LXXI). (Herbe à la paralysie) : Cowslip. Differs from the above in the smaller, scented flowers, with five orange marks on the throat; by the inflated calyx, with a whitish tomentum. Grows in the lower meadows. March-May. Likes limestone.

P. acaulis (*P. grandiflora* or *vulgaris*). The large and charming Primrose of French Switzerland. It is curious to note now this species seems to shrink from the German language and follows close along the inner side of the frontiers of French Switzerland, where it spreads its fine, lemon-yellow flowers in every cool place of the plains and sheltered valleys. It thrives best in rich, dampish loam, and in rockeries should be given a north or north-west aspect.

The above three species have yielded by artificial hybridisation a multitude of different forms, whose



ROCKERY AT BOURG-SAINT-PIERRE
(LINNAEA GARDEN)

many-coloured flowers are among the most beautiful of our garden ornaments in spring. To England, where the Primrose, like the Rhododendron, has become a necessity of life, is due, more than to any other country, the perfection to which the flower has reached. Lord Beaconsfield's favourite, the emblem of the Primrose League, is *P. acaulis*. The flower of *officinalis* is gathered by the inhabitants of the Swiss hills; the infusion is used for coughs, or as a tonic and sudorific; the root is employed in cases of paralysis.

P. auricula (Pl. LXXII). One of the gems of limestone rocks in the Alps. 1200-2200 m. June-July. The beautiful and very fragrant golden flower rises from the heart of a rosettes of leaves, and the meal with which it is powdered has won for it an immemorial popularity, for it was introduced into cultivation in Holland and England as far back as 1596. It is the type from which the immense number and manifold forms of garden Auriculas have sprung. As such, the florist's *Auricula* has established a cult of its own and it would be here out of place to deal with the subdivisions made by fanciers or the minutiae of cultivation. Sound light loam, packed by preference between fissures of rock, is suitable and a sunny position, but precautions against excessive drought should be taken. There is a beautiful white form, *P. aur. alba*, and another with powdery leaves and a white edge to the flowers, *P. aur. marginata* which should be wedged between limestone. It is totally distinct from the south alpine and Piedmontese species *P. marginata* which is named from the powdery edge to the leaves and whose flower is lavender, darkish blue or rosy lilac. This species also has given rise to many beautiful hybrids.

P. minima (Pl. LXXII). A wee little alpine not exceeding one inch, with disproportionate sessile flowers,

generally solitary, of beautiful rosy-lilac, rarely white. Leaves glabrous, cheerful green, and deeply toothed at the tip. June-July. Eastern limestone Alps. 1700-2200 m. A well drained niche of very sandy peat, with a liberal topdressing of silver sand. It grows best in partial shade, but flowers best with sun.

P. hirsuta (*P. viscosa*) (Pl. LXXIII). The well known, rosy flowered primrose from the granitic rocks of the Swiss Alps, found from the valleys up to the snow-line, which gives such wonderful touches to the landscape at the time of nature's re-awakening. Ordinarily bright carmine, it is here and there found with white flowers. Naturally hybridising with *P. auricula*, it has given rise, in the Alps of Vaud and lower Valais as well as in Tyrol, to numerous crossbreeds which are welcomed into our gardens. The collection at Linnæa is admirable and well worthy a visit. Into the resultant minute differentiations it would be wearisome to go. Perhaps the best varieties, in addition to the type, are *P. vis. ciliata* and *P. pubescens alba* or *helvetica* which is identical with that commonly, but incorrectly, known in gardens as *nivalis*, as the true *nivalis* is a Caucasian. The flowers of *P. helvetica* are more boldly displayed than those of *viscosa* and of much more telling white. Both are charming and easy plants, preferring sandstone and granite to chalk.

P. latifolia or *graveolens* is not unlike a less viscid and robuster *viscosa*, with larger and broader leaves, which sometimes measure 4×2 in. ; the stem, often twice as long as the leaves, carries a fine umbel of 2-15 fragrant, lilac-violet flowers. Sunny, sandy peat slopes of the Grisons with plenty of summer moisture. Top dress regularly.

P. integrifolia (syn. *P. Candolleana*) is a small species ; leaves elliptic-oblong, greyish-green, glandular-ciliate on

the margins; flowers fairly large, rose-lilac, on stem of $1\frac{1}{4}$ - $3\frac{1}{2}$ in.; calyx petaloid, ciliate and very prominent. It literally carpets rock-slopes in the limestone Alps of eastern Switzerland. 800-2000 m. Easily grown in rockeries; partial sun. The last three species will readily make themselves at home in walls, given a full north or a northerly position.

P. farinosa * (Pl. LXXIV). Small native of alpine bogs; roots strongly scented with anise; leaves covered below with a white or sulphury meal; flowers in varying shades of bright red in erect umbel. May-July. Moist grasslands of the mountain districts. Highly recommended for gardens; selective cultivation has produced a variety with pure white flowers. The Balkan *frondosa* is often sold for it—a charming plant but the petals are not cut in the centre and the farina is much more abundant and covers the leaves on both sides.

P. longiflora, from moist, high turf in the Pennines, Oriental Alps and Dauphiné, is distinguished by almost entire leaves, few-flowered umbels, larger bloom, the corolla-tube three times as long as the calyx. Easily grown in sunny, porous and moist soil and a charming ornament to a rockery.

Cortusa

C. Matthioli (Pl. LXXIV) is a graceful plant with soft heart-shaped leaves, daintily palmate; a slender, downy, leafless flower-scape; a small, terminal raceme of most vivid carmine, drooping, bell-shaped flowers. July. Torrent banks and shady places in the Grisons.

C. pubens a fine, larger-flowered variety, with greyish leaves, flowers well in gardens, but requires a position which will be fairly dry in winter. The soil for both

should be a mixture of loam, peat and leaf mould. Both, like *Primulas*, are apt to lift in frost and should be firmly pressed back and made snug with a dressing of peat. Propagated by seed, but slow germinators.

Androsace

Eng.: Androsace; *Fr.*: Androsace; *Ger.*: Mannschild.

These children of the highest rock-faces, these most alpine of alpiners, may, except so far as mere number goes, be thought by many to queen it above the *Saxifrages* and vie in royalty with the Alpine King, *Eritrichium*. The dwarf, compact tufts crowd into carpets or solid spheres of tiny leaves, starred with countless flowers like wee *Primroses*. Yet among themselves they observe degree, priority and place. Highest are such as *Charpentieri*, *glacialis*, *helvetica*, *imbricata* and *pubescens*, the group, that is, of close cushioned habit, whose stalks are furnished below with older leaves up to the point where young ones burst to build up tiny serried columns, bearing flowers always solitary and often sessile so as to hide the underlying foliage. Members of this group must be multiplied by seeds which are slow germinating. Less compact in habit, with racemed or umbellate heads of blossom on longer foot stalks, and with leaves in less natty rosettes, are *carnea*, *chamaejasme*, *lactea*, *obtusifolia*, *villosa* and *vitaliana*. These may be propagated also better by seed than by cuttings. But, even fresh gathered, it is tricky, and always calls for patience except in the case of the unvalued and unnoticed annuals and *A. lactea*, which stands midway between the annuals and the perennial kinds. Not all are difficult; the easier are mentioned in describing individual species; all should be planted in such a position as will avoid, so far as may be, winter moisture, and special care, such as coverings

of glass, must be given to the woolly kinds. The culture of all the high alpine species in perpendicular walls, facing south, is to be recommended. Most seem to prefer (*glacialis* is a notable exception) dryish cracks of sunny rocks, protected from direct moisture but enveloped in a warm and humid air. But above all air, pure air is their chiefest need. And unfortunately, with every care, he would be a temerarious optimist to proclaim any, even those that flourish, long-lived in gardens.¹

Small plants with leaves in more or less compact rosettes; calyx campanulate, 5-toothed; corolla-tube short, constricted at the throat, limb 5-lobed.

A. lactea (Pl. LXXV). Glabrous; leaves linear-lanceolate, dark green, glossy, in loose rosettes; scapes slender, simple or somewhat branched; flowers 1-4, large, pure white, with emarginate divisions. June-July. Rocks of the Jura and some peaks in the limestone Alps (Stockhorn). Excellent for rockery or pots, even for borders. Only asks a porous soil and partly shaded position. Develops finely under culture, and is easy from seed.

A. carnea (Pl. LXXV). Differs in narrow pointed leaves, downless and bluish or reddish green, smaller rosettes; flowers brilliant pink. June-August. Dry, rocky slopes of granitic Alps; 1500-2300 m. The variety *Laggeri* from the Pyrenees has larger flowers, and forms a more compact green sward. Both require deep, light soil, peat and sand, and plenty of sun but not scorching. In these circumstances with plenty of water in dry seasons, especially when the plants are young, and abundant topdressing of silver sand, they are not difficult

¹ I published in *the Garden* (vol. XLIII, 1903, p. 332, 351, 370 and 391) a full description of all the *Androsaces* and of the culture of every one of them.

and often spread by self-sown seedlings to broad carpets. The *A. carnea* is a chalk fearing plant.

A. obtusifolia. Very common in alpine meadows; forms small tufts of blunted, lanceolate leaves of greyish green, briefly ciliate; flowers white or rose with yellow eye, generally small, in compact umbel on stem of 2-4 in. June-August. A ruby red variety reported near Leuk. It is larger and perhaps easier than its kindred chalk-loving *Chamaejasme*, to which it is preferred by some experts. Deep, well drained peaty loam, well covered with broken stone.

A. villosa (Pl. LXXV). Small, downy, running plant; leaves silky, whitish, in small, glandular, close rosettes; flowers white (bright pink in bud). Southern Jura. May-July. Perhaps the kindest and most beautiful of the kindlier Androsace, with flowers so big and cheerful. It will even grow in sandy borders, but deserves better treatment. That recommended for *carnea* will serve, though this variety is more thirsty. It is, however, a chalk-loving kind.

A. Chamaejasme differs in that the leaves are without silky down and hairy only beneath, with ciliate margins, in open, flat rosettes; flowers white, with a yellow eye passing to bright rose after fecundation. July-August. Grassy and rocky slopes of calcareous Alps; 1500-2500 m. Like *obtusifolia* and *villosa* it asks for well drained, light loam, plenty of sun and water, and broken stone round the collar.

A. helvetica (*Aretia helvetica*). Forms a pretty, compact cushion of small, greyish leaves, very close-set, which are united round the crowded branches in the form of little cylinders, the old ones persisting in the centre of the tuft and keeping it compact. Sometimes the general appearance looks like a mass of tiny hem-

ispheres, which are literally covered with pearl white, sessile flowers, larger than the rosettes they crown. The mass of flowers may at times be so great as to cover completely the foliage, leaving nothing visible but the face of the flowers embroidered on the cushion. Summer; in chinks of high rocks of the limestone Alps; 2000-2500 m.

A. pubescens is distinguished by longer and narrower leaves, very downy with star-like hairs, not arranged in cylindric columns but forming a rosette at the end of the branches, thus making the habit less compact; flowers white with a yellow eye. Rock slopes and rock-crevices in the limestone Alps of western Switzerland and Appenzell; 2000-3000 m. A peculiar differentiation from its kin is a slight swelling on the stem close to the flower. An exquisite variety.

A. imbricata (*argentea*, *tomentosa*) is similar to *helvetica*, except that the leaves are silver-white, the habit more compact and dwarf, the leaves shorter, arched, very dense; the overlapping flowers smaller, glistening white with yellow centre. July-August. Rocks of the granitic High Alps, growing in places sheltered from rain under the protection of projecting cornices where it worms a way into the most invisible chinks.

A. glacialis (*A. pennina*, *alpina*). A delicious cushion of tender rose to be seen springing up in the highest parts of the Alps, especially in the primary formations, and forming at 2200-3000 m. the advance-guard of the upper limit of vegetation. It tells of some summit ridge or icy glacier at hand. Even more than in *A. helvetica* do the blossoms huddle themselves close to the surface of the cushion, spreading there an unbroken sheet of glowing colours, white or vivid carmine or intermediary shades according to the variety. They greet, these rosy,

white or carnation cushions, the climber on his upward way and speak to him of courage and of strength. Dwelling among the fairest, frailest gems of alpine flowers, it hymns with them their maker's glory.

Que de fleurs, de parfums, sur la montagne en fête,
Que de concerts joyeux s'élèvent au Seigneur ;
Et combien de bonheurs qui montent de l'arête
Vers le trône de Dieu pour chanter sa grandeur !

Androsaces of this group *Aretia*, that is, all the species described from *helvetica* onwards, are unusually difficult to coax into cultivation. But compared with *glacialis*, the others three are easy. *Glacialis* also is peculiar in its habitat, for whereas the others come from deep, narrow clefts where no large quantity of permanent moisture is present, this one comes from soaking morainic debris, with water in abundance but no stagnation. All, especially *helvetica*, love unlimited sunlight. Water should be freely given in summer but not on the foliage, which would then turn rusty. All need deep roothold, *helvetica* and *pubescens* sandwiched between faces of limestone, *imbricata* in a very sunny wall among broken granite. All are benefited by top-dressing of congenial stone-chips, worked all around to absorb superfluous moisture, for despite the need for copious occasional waterings, all, except *glacialis*, need absolute dryness such as in a sunny face of a wall or rock.

A. Vitaliana (*Aretia*, *Douglasia*, *Primula* or *Gregoria Vitaliana*). A tiny spreading, tufted plant, forming thick, greyish swards; leaves lanceolate, linear, with a clear streak on the margins; flowers relatively large, brilliant yellow, solitary or in whorls among the leaves towards the tips of the branches. June-July. Dry, parched slopes of the Alps, except in chalk. One of the

finest of rockery plants, and of those most amenable to culture. In walls, rocks, or even in a border it will make magnificent tufts covered in March and April with gloriously brilliant yellow flowers. Treat like *A. carnea*.

Soldanella

Eng. : Soldanella ; *Fr.* : Soldanelle ; *Ger.* : Alpenglockchen.

Charming modest alpine, but quite easy to grow in humid England from strong young plants in a somewhat shady position near a bog. Otherwhere some retentive material such as moss or cocoanut fibre must be packed round them to check evaporation. They are perhaps the best plants for experimenting in England with the sphagnum method described in the General Introduction. Propagate by division ; seedlings are tedious.

The characteristic of the genus and the representative species are :— Small perennials with strongly anise-scented root ; leaves orbicular ; calyx 5-cleft ; corolla bell-shaped, fimbriated.

S. alpina (Pl. LXXVI). Very familiar ; leaves thick, cordate-reniform with two ear-like drooping lobes at the base ; flowers three to four, bell-shaped, violet, drooping. Always found near melting snow, at the disappearance of whose white carpet the *Soldanella* gives a cheerful touch to cool, turfy pastures over all the alpine chain and in one portion of the Jura.

S. pusilla, which is confined to the snowy zone of eastern Switzerland (2000-2800 m.), differs in smaller size, leaves sinuate at the base, stem not exceeding as a rule 2 in., corolla of clear lilac with longer bell and briefer fringe to scarcely $\frac{1}{3}$ of the length.

S. minima (Pl. LXXVI). Leaves still smaller, quite entire, slightly downy ; one flowered ; corolla relatively

larger, narrower, cylindro-campanulate, pale lilac with deep violet streaks within. Eastern limestone Alps; 2000-2500 m. White flowered varieties of all three are found :—

Saluez sur nos monts la douce Soldanelle,
Cueillez avec amour la fleur des champs neigeux;
Admirez sa corolle au rebord de dentelle,
Sa robe d'améthyste et ses reflets soyeux.

Vers le sol tout glacé la clochette se penche,
Le blanc névé qui fond la retient sur son seuil;
Elle paraît trembler aux bruits de l'avalanche,
Et des bonheurs défunts porter un sombre deuil.

Cyclamen

Eng.: Sowbread; Fr.: Pain de pourceau, Violette des Alpes;

Ger.: Erdscheibe, Alpenveilchen.

C. europaeum (Pl. LXXVII), Everyone is familiar with this native of stony, half-wooded slopes of the chalk formations, filling the autumn air with peculiar and delicious fragrance. The medium-sized, irregularly shaped tuber with thin, smooth, yellow rind, often throws out underground stems a foot away among stones and under bushes. The leaves, which appear before or with the flowers, are in themselves most beautifully marked and with the vivid carmine or occasionally white flowers give life to the late summer landscape. One of the best of garden plants, succeeding in any sound loam under partial shade, if planted sufficiently deep to provide for the runners and offsets. Naturally it is partial to limestone or mortar rubbish, and often flourishes in the heaps of fallen walls. The name Sowbread, little suited to such an honest beauty, comes to it from the passionate liking of pigs for the tubers, which, again, are valued for

a peculiar principle called Cyclamine which makes them useful as an emetic or purgative. It is also used by rascals to poison streams.

C. hederæfolium * (*C. neapolitanum*) is to be found near Villeneuve and Port-Valais. Distinguished by angular, crenate leaves, which appear after the flowers and fall in summer; flowers large, scentless, pale pink, preceding the foliage. The rough, somewhat scaly tubers of this variety are enormous and, being absolutely hardy, are excellent for partly shaded places in gardens. There is a beautiful variety with pure white flowers. Care must be taken in planting to allow for the fact that the tuber often produces roots from the upper surface, but, beyond this, they should be as near the surface as possible to permit of thorough ripening, and for the same reason the dying leaves and other rotting substances should be regularly removed.

Both species enjoy good friable soil, broken limestone and leafmould. Moisture, given ample drainage, is desirable. The leaves need shelter from violent winds, and indeed deserve it for their beauty. Both resent disturbance. Seedlings are easily raised in pots, to be transplanted when the first leaves are half developed and put out in the succeeding summer. Established plants increase readily from self sown seedlings.



Gentianaceæ



Gentiana

Eng. : Gentian ; *Fr.* : Gentiane ; *Ger.* : Enzian.

To the ordinary traveller Gentians are, with the exception of that flannelled farceur the Edelweiss, the typical family of alpinists; being natives of the lower mountain zone they come within the range of all visitors, the most inobservant of whom cannot fail to notice the matchless azure of, for example, *acaulis* and *verna* or the stately carriage of *lutea*. To pass over the annual species, which, despite much decorative charm, are scarcely suited for the rock garden, one may say that the race as a whole are moisture lovers, comparatively indifferent to soil, though partial to peat and limestone, sun-worshippers, impatient of disturbance, and easily raised from seeds, though these are very slow to germinate. In addition to the natives of the Alps, species from Siberia and North America are altogether worthy, charming in tint, elegant in form and graceful in carriage. The members of the group *purpurea*, however, are not easy to preserve. The generic characteristics are :— Calyx tubular or campanulate, 4-10-lobed; corolla funnel-shaped, bell-shaped or salver-shaped, 4-10-lobes; stamens 4-10, inserted on the corolla-tube; style nil or very short, with 2 stigmas persistent on the capsule.

G. acaulis (Pl. LXXVIII). This time-honoured species of Linnæus should not now be recognised in actual nomenclature; it is composed of four types which are markedly different from one another. All are, of

course, plants with sessile leaves, large dark blue flowers in the shape of an elongated cup; but there are distinct varieties according to situation and soil, some being peculiar to limestone, some to granite, some to high alpine pastures, some to those of the Jura. These four species are known as (a) *G. Clusii* (Pl. LXXVIII). Dwarf, compact, cæspitose; leaves coriaceous, thick, entire, lanceolate-acute, dark green, with central vein; scape $2\frac{3}{4}$ - $3\frac{1}{4}$ in. at most; flower large, erect, charming violet-blue, corolla with 5 short lobes; calyx-teeth acute, appressed to the corolla and separated from one another by acute angles. From thin, rocky pastures of the limestone Alps and Jura; 1200-2000 m. (b) *G. Kochiana* (Pl. LXXVIII). Leaves large, smooth, spreading, many-veined, yellowish-green; flowers blue tinged violet, with five blackish-green splashes on the throat; calyx-teeth spreading, oblong, more or less constricted at the base and separated by truncated angles. July-August. Granitic Alps; 1400-2000 m. Some peaks in northern Jura. (c) *G. alpina* differs from the last in a running rootstock; smaller leaves of an almost bluish green, in ball-shaped rosettes; smaller flowers of intense blue, never on other than very short stems, and often sessile. Summer-flowering. Poor pastures in the High Alps; 2200-3000 m. Lastly (d), in the Alps of Dauphiny and of Savoy is found the most beautiful of all, *G. angustifolia*, which under the name of *Gentianella* has for three hundred years been grown in English gardens. The stem is stoloniferous; leaves linear, of beautiful, shining green; flowers large, a glorious blue on stem of 4-10 in. Easily grown in a somewhat firm soil and partial sun. In England and in some parts of Germany it is used to make unbroken edgings of ideal beauty.

The confusion, which has hitherto engulfed these differences under the name *acaulis*, justifies one in inflict-

ing upon our readers the above somewhat minute differentiations. There is no difficulty in treating either these or, indeed, most other European Gentians, except of the *bavarica* group; they want nothing but deep moist peat or fine loam, with plenty of the appropriate rock grit, granite for *Kochiana* and *alpina*, lime for *Clusii* and *angustifolia*. Firm planting is absolutely necessary and each spring any plants lifted by the frosts must be well pressed back. The soil, though moist, should be well drained to ensure ripened crowns. Above all, avoid over-coddling, from which, more than anything else, they like many other alpine have suffered, and give abundance of pure air.

*G. verna** (Pl. LXXIX). The most delicious of our Swiss Gentians and the veritable star of our hills, though the Jura folk may absurdly call it "cat's-eye". Cool meadows in all Swiss mountains, from the plain up to the glacier zone, but only attaining its full beauty and brilliance in chalk rather than in granite.

Belle étoile, en ta fleur où le ciel se reflète,
J'ai lu comme en un livre un chapitre nouveau,
Et dans l'intensité de ta grâce discrète
J'ai trouvé du bonheur le récit le plus beau !

C'est Dieu qui te sema sur le haut pâturage,
Pour charmer nos printemps, pour égayer nos jours,
C'est Lui qui te plaça comme un divin mirage
Pour étoiler des monts le tapis de velours,

C'est vers Lui que ton hymne, au nom des créatures,
Monte chaque matin sous les feux du soleil;
C'est pour Lui que scintille en riches émaillures
Ton merveilleux saphir qui n'a pas son pareil.

Divin être d'azur au cœur pur qui scintille,
Vis tranquille et joyeux sur le riant coteau.
Car partout, fleur du ciel, où ta couronne brille,
Elle enfante la joie et luit comme un flambeau.

A white variety (Pl. LXXIX) has been found in the Jura and the Alps and these albinos do wonderfully well at Floraire. And, generally speaking, *G. verna* is a splendid plant for gardens, given sun and just a little firmness of soil. At the same time it is, one must admit, a capricious beauty and a thing of whims and fancies, so that the only real way of making sure of establishing it is to try it in several different positions, not forgetting short clean turf; let each be deep moist sandy loam, facing south; put plenty of stones about the collar and pure sand on the surface and round the roots; water daily in summer, and then the chances are that one or two clumps will choose to be content and flourish, but why these more than the others none can say. It is well to nip off the dying flower buds.

G. brachyphylla (Pl. LXXIX) may be called a small and high-alpine form of *verna*. Leaves shorter, thicker; calyx longer, more fringed, more slender and without wings; corolla-tube also thinner and elongate. July-August. 1900-3000 m.

G. bavarica (Pl. LXXIX). Here we have the most beautiful and velvety sapphire imaginable, azure of ideal perfection. Leaves ovate, blunted, like box, of glossy, shining green, very close to the base of the stems. August-October. Margins of alpine streams and damp meadows; 1400-2800 m. A pure white variety has been met in the Alps near Bourg-St.-Pierre. For this evil-tempered beauty, one can only recommend even more moisture, if only not sour or stagnant, than for *verna*; otherwise treat similarly and hope, hope for the best.

G. asclepiadea (Pl. LXXX). The beautiful autumn Gentian of the limestone Alps, whose floral scapes bend under the weight of blooms like acanthus leaves beneath that of a Corinthian temple. A strong, vigorous, herbaceous plant; stems 20-30 in., furnished throughout its

length with pairs of opposite leaves and terminated with a spike of dark blue flowers, spotted green, set in the axils of the leaves. In some alpine valleys, on the Via Mala, for example, the flowers are of snowy whiteness. Both forms may be grown in deep, cool soil, under shade. Though impossible to dig up whole any fragment of root property treated will take hold. In the Wisley Garden, of the R. H. S. it grows like weeds!

G. cruciata. On stony and sunny chalk hills one meets a tufted Gentian with glossy, reticulated leaves, oblong-lanceolate and arranged in cruciform pattern; the flowers are without peduncle, in a close cluster, the corolla heavenly blue and cleft into four opposite lobes. Grown with ease in sunny parts of gardens, and, withal, of great beauty.

G. lutea (Pl. LXXXI). A magnificent plant of statuesque habit, which stamps all our chalk downs, but particularly in the Jura, with a beauty that few will wish to contest. Mr. Farrer does not agree with this opinion, but there are not many artists who will not join me in my admiration for this fair daughter of our hills. Rambert, too, seems to escape from its attraction. He is pleased to decry its military carriage and assuming of soldier-like airs, to recall the use of the roots in making a spirit strange of taste and strange of perfume, yet for all that wholesome and refreshing, if drunk, as intended, on a glacier ten thousand feet or more above the sea. In his verses à *Molèson* again he mentions this property:—

Mais une herbe des monts, distillée au chalet,
Herbe que le troupeau dédaigne pour son lait,
La Gentiane jaune, ou bleue, ou purpurine,
Recèle ce nectar en sa forte racine;
Elixir de chasseur, trésor des montagnards,
Il ramène la vie aux lèvres des vieillards.

E. RAMBERT.

I have elsewhere, on evidence taken from good authorities, alluded to these medicinal properties and

have mentioned that Pliny thought highly of them. Indeed he prepared a wine which probably is little different from the liqueur made in our hills and which was even in his day regarded as an excellent stomachic, aperient and digestive. In case of a real, honest mountain thirst, cut the tiniest fraction from the root and put it in the mouth; the thirst will vanish in a moment, if you can, that is, endure the uttermost of bitters—that of the Gentian.

G. lutea does not take kindly to cultivation. Nevertheless, in Austria, it is grown for exportation on a large scale in fields or even on railway embankments. It loves a deep, limestone, mellow soil, and, above all, resents disturbance or transplantation. The seed, sown when fresh, germinates readily; when the seedlings have five or six leaves, they should be transplanted into permanent quarters. At Floraire it is raised in pots for export, and, as a rule, succeeds.

G. purpurea (Pl. LXXXII). Not by any means so robust or tall-growing as *lutea*, scarcely exceeding 16-20 in.; leaves shining, dark green, strongly veined; flowers large, with a narrow cup, crowded in terminal clusters, and pleasantly scented; corolla red-brown, only opening under strong sun and never completely; calyx split on one side to the base. Cool alpine pastures; 1500-2200 m.

G. punctata is distinguished by a short calyx, usually not split, with six unequal, lanceolate, linear teeth; by a pale yellow corolla, spotted blank, with six blunted, erect lobes. July-August. Alpine pastures.

G. pannonica, the last of the group *lutea*, is distinguished by dark red flowers, tinged with violet, spotted black, and by reflexed calyx-lobes. Alps of St-Gall.

None of this group are easy to grow, and it is only in the moist climate of England that they may be seen really acclimatised. They require a deep, porous and not too moist soil, partial sun and yet at the same time a distinct coolness in the air.

G. Gaudiniana, *Charpentieri*, and *Thomasii* are hybrids between species of the above group. Hybridisation takes place naturally even in gardens according to Kuznetzow who quotes a case which occurred at St-Petersburg among the fine specimens of *M. Kesselring*.

*G. Pneumonanthe**. A marsh plant of lower levels, almost of the plains, if the Gentian can be a lowland plant. Stem rigid, 8-20 in.; leaves many, opposite, the upper linear, lanceolate, the lower reduced to simple scales; flowers large, fine indigo cups, in compact clusters on the upper part of the stems; corolla with 5 triangular lobes. August-September. Marshes at the foot of the Jura, from Divonne to Bâle, and those of the Rhone valley, especially near the entrance into the Lake of Geneva, etc. A white variety has been found at Cobham, in Surrey.

G. ciliata (Pl. LXXXIII). Small, autumn plant, with lilac-tinted azure-blue flowers carried 1-7 on a slender, short stem. Here and there a white variety may be found. Seed is not easy to obtain, as it ripens very late; consequently it is a rarity in gardens. Besides one must confess that it is impossible to preserve over winter. Still its beauty, unique even among Gentians, compels one to try it in sunny fissures of limestone, packed in rich loam and grit, or in turf alongside *verna*.

The annual Gentians frequent the meadows and pastures of the mountains. All are lowly, very floriferous plants, with azure blue or violet flowers. The best known is *G. germanica* (Pl. LXXXIII); stem 8-12

in.; branches clustered; corolla 5-lobed, deep violet tending to brown; August-September. *G. campestris* is distinguished by a lower habit, clear-violet flowers, 4-lobed, and calyx divided to the base into 4 unequal lobes. June-October. All Swiss mountains. A white flowered variety is at times met.

*G. nivalis** is a tiny plant which is never noticed except when the dainty corolla, of an intense azure—the most beautiful blue that one can dream of — chances to be open beneath the rays of the sun. Stems slender, erect, branched from the base; flowers many, tiny, solitary, on the tips of the branches, opening in succession from July to August. In *G. tenella* the stems are of the slenderest, scarcely 4-6 in., leafless, branched from the base, never in the upper part, each bearing a small, violet flower, generally drooping over the stem. July-August. Alps; 1900-2500 m. Moist, sandy soil. Alas that so superb an annual should be so difficult to raise.



Boragineæ



The Borage order contains but two genera of value in alpine gardening, but two of supreme merit—*Myosotis* and *Eritrichium*. They are to be distinguished by the general hairiness of the plant with rounded or irregularly angular stems; the leaves are alternate, undivided and seldom toothed; the racemose or spiked inflorescence is usually incurved before opening often in a scorpioid i. e. crozier-like form, each flower consisting of a five-cleft, persistent calyx, a five-lobed, monopetalous corolla, with five alternating stamens. Most genera, especially Borage, secrete a mucilaginous juice, which gives them emollient properties.

Myosotis

Eng. : Forget-me-not ; Fr. : Ne m'oubliez pas ;
Ger. : Vergissmeinnicht.

M. alpestris * (Pl. LXXXIV). A pretty Forget-me-not with flowers of intense azure-blue and a yellow-eyed throat, which is common in the grasslands of the Alps and Jura, sometimes climbing to mountain passes of 2500 m. It is also found with white and rose flowers, and has been introduced into gardens nearly a century ago. Cultivation has enlarged and modified the type—improved it, to judge by the catalogues of seedsmen! But the use of it for fashioning living carpets, formal beds or even mosaic patchwork has sadly detracted from its natural glory. I myself am one of those who have always protested against such an use of the alpine flora,

which is but to abuse and prostitute it in the service of false, ephemeral taste, and shall continue to protest against such a base interpretation of garden-craft. The proper place for the alpine *Myosotis* in the alpine garden or among the grasses of a park or to make a picture in some secluded corner; but its very nature, so sweet and delicate, is degraded by employment as mere constructive material, to subserve some garish effect of colour.

The nomenclature of Forget-me-nots has become entangled; for example, usage varies as to whether *M. rupicola* is to be regarded as a superior form of *alpestris* or as a distinct species. In appearance it approximates towards the unique *Eritrichium*, but is a much more robust and manageable plant. Yet it is more exacting than the commoner forms of *Myosotis*, requiring absolute dryness in winter, wedged among millstone grit or sandstone and covered during the dormant period. In cultivation all alpine kinds succumb to an amount of winter moisture that would be innocuous in a natural habitat. Both come quite true and freely from seed.

Eritrichium

E. nanum (Pl. LXXXIV). High, very high on the desolate Alps, on the ridges beaten by the most savage fury of the storm a wonderful jewel sparkles in the sun of the towering heights. Our mountain people know it as The Alpine King, or The blue Moss; at Saas, too, they call it Alpenkönig, in Tyrol Himmelsherold. Botanic prose has named it *Myosotis nana* or *Eritrichium nanum*. It is a cushion plant, whose tiny leaves are set with grey, silky hairs—a dense little tuft buried in July and August beneath flowers on the shortest of short stalks, the corollas of the most superb of blues. It is one

unbroken cushion of glorious azure, the leaves no longer visible beneath the shimmering, sheeny covering. The alpine of alpinists, the plant of the snows, not to be forgotten by him that has once seen it on his way!

The cultivation calls for exceptional care. Absolute dryness, partial sun, a light and porous soil are essential. At Floraire it is grown under full sun in Sphagnum. No trouble can be too great to expend up this most glorious of alpinists, yet one can offer little hope of real success. Imported clumps may flower once and then die. Yet every now and then some tale of unexpected success whips the undying hopes of enthusiasts to renewed efforts. Mr. Farrer reports well of culture on his moraine; others flower it from seed, which, by the way, is the only way of propagation. Mr. Clark, in his valuable little book, gives elaborate instructions as to planting in very gritty loam and finely broken granite, which it would be unfair to quote at length.¹

The best plants of *Eritrichium nanum* I have ever seen were those grown by my late friend the Hon. C. Ellis at Frensham Hall, Haslemere. He had grown then by seeds and had large pans of this beautiful sky-blue plant covered with flowers. Mr. H. Burroughes, at Ketton near Stamford, grew the plant well and kept it for seven years alive. At the botanic garden of Edinburgh, also, it grows well and endures; but, as everything is growing there so luxuriantly, it is not a wonder that *Eritrichium* does well too. I know another case, at Scampston Hall, Rillington, in Yorkshire. Only recently Mr. W. H. St. Quintin wrote to me: "I have still six *Eritrichium* plants now growing fast. But they are in a frame and their pots are plunged in larger ones into which we give the water. Two of them are from seeds we ripened

¹ *Alpine plants* published by L. Upcott Gill.

here, and the other four are from seed which you sent me four years ago."

Sur le rocher bruni que battent les orages,
Au sommet de nos monts, un bijou d'un bleu pur
Resplendit au soleil et sourit aux nuages,
C'est le *Myosotis* nain dont la fleur est d'azur.

Petite fleur des cieux sur la terre oubliée,
Bijou que pour Lui seul semble avoir créé Dieu,
Nul ne peut te cueillir sans porter sa pensée
Vers l'éternel Auteur de ton vêtement bleu.



Scrophularineæ



An order of plants generally herbaceous, with alternate, opposite or whorled leaves, without stipules, The calyx of the more or less irregular flowers is 4-5-cleft and persistent, the corolla one-petalled, with 4-5 unequal lobes, simple or two-lipped. The stamens are either two equal ones, or four to five unequal; the style is single. The bitter, acrid juice is in some species of medicinal value.

Linaria

Eng. : Toadflax; *Fr.* : Linaire; *Ger.* : Leinkraut.

Most valuable for creeping among walls or stone steps; but the wide roaming varieties like the Italian *pallida* are too assertive for choice positions, however beautiful in flower. In addition to *L. alpina* (with a precious white variety and a pink one) every one should grow at least the South Europæan *origanifolia* with long violet racemes of orange-throated blossoms. They succeed in either lime or sandstone, given a dry, sunny, southern aspect, where they will seed freely without attention, though perhaps it is safer to cut off the long flower stalks and buy the seed.

L. alpina (Pl. LXXXIV). Glabrous and glaucous; stems short, many, forming a small, dense tuft; leaves mostly opposite or in whorls along the stems; flowers beautiful violet, with a bright saffron spot on the lip, in short racemes. Any stony, sandy, or morainic soil in

the Alps. Occasionally flowers may be found which are pure white or pink or carmine red. In *L. concolor* the saffron mark is missing.

L. petræa, which is found in the southern Jura, differs from the type in more upright habit, narrower leaves, flower-spurs longer and more slender, corolla narrower and longer.

Veronica

Eng.: Speedwell; *Fr.*: Véronique; *Ger.*: Ehrenpreis

Few words of description are here needed; for the plant is familiar to everyone. Yet all are not aware that the "shrubby" Veronics (not treated here) are from New Zealand, while the "deciduous" Veronics are from the old world and are in many cases deciduous only in appearance, being at the base sub-shrubs. Many which are exquisitely beautiful are too strong for alpine work and only fitted for the border, but good dwarf varieties from outside the Alps, such as the *Allioni* (from the western Alps) the pink *caespitosa* from Lebanon, *peduncularis* (Asia Minor) and the European *prostrata* are well worth growing. Of those described *saxatilis* and *fruticulosa* are for the best and easiest. Propagation by seed, division or cuttings is simplicity itself; every shoot will root and creeping kinds root themselves.

The botanical description of the genus and the species found in the Alps is as follows — flowers small, in axillary or terminal racemes; lower cauline leaves opposite, upper alternate and often bracteate; calyx with four, seldom five divisions; corolla rotate, tube short, lobes four, the upper broader than the others; stamens two.

V. saxatilis * (Pl. LXXXV). Small plant with hard, spreading branches, throwing up stems furnished with ovate, glabrous, slightly toothed leaves; flowers intense

blue, shortlived, with crimson ring near base of white cup; stamens prominent, yellow. July-August. Rocks of the Alps and Jura; 1000-2500 m.

V. fruticulosa differs in higher, more erect stems; leaves longer, of brighter green; flower reddish or whitish, in elongate, glandular-hairy raceme. July-September. Rocky places in the Alps and Jura.

Both these allied species do excellently in rockeries, alpine gardens, or old walls. Sound but somewhat stony soil; sun.

*V. spicata**. Brightens grassy, dry banks in autumn with beautiful indigo clumps of pretty blue spikes; leaves oblong, crenate, grey-green, pubescent, the lower opposite, the upper dispersed; flowers small, very numerous, deep blue (seldom white or pink), in erect, crowded, narrow spikes. Easily grown; adapted alike for carpets or edgings.

V. bellidioides (Pl. LXXXV). Small, tufted plant; leaves obtuse, rather large, grey-green, in coarse rosettes; flowers small, blue, in short, slightly hairy racemes.

*V. alpina**. Small, pubescent plant; leaves many, ovate, entire or crenate; stems ascending; flowers pale blue, in short, pubescent racemes. July-August. High Alps; 1000-2500 m.

V. aphylla (Pl. LXXXV). Differs from the preceding chiefly in a leafless stem with a short, few-flowered raceme of blue, reticulated flowers. June-August. Stony pastures of the Alps and Jura.

Digitalis

Eng.: Foxglove; Fr.: Digitale; Ger.: Fingerhut.

These stately, erect plants are, as is well known, extremely poisonous owing to the presence of a variable

quantity of digitaline, which has a marked power to slow the movement of the heart and lower the bodily temperature. Yet, conversely, they have a pharmaceutical value, on which my work entitled *Le Jardin de l'Herboriste* may be consulted. All varieties are boldly ornamental for wild garden or coarser borders, asking nothing beyond somewhat rocky ground and full sun. The distinctive characteristics are the five-fold calyx, the bellshaped, tubular corolla, with fairly similar lips.

D. ambigua (grandiflora) (Pl. LXXXVI). Stems 24-in., erect, hairy; leaves oblong, lanceolate; flowers large, ochreous-yellow, in terminal spikes. June-September. Mountain districts throughout Switzerland.

In *D. lutea* (Pl. LXXXVI) the leaves are glabrous, deep green; the flowers small in long, narrow spikes. Flowers all summer in mountain and lower regions.

Erinus

Eng.: Erinus; *Fr.*: Mandelize; *Ger.*: Leberbalsam.

E. alpinus (Pl. LXXXVII). One of the prettiest sights imaginable is that of the pink carpet spread by these plants, as they nestle against walls of rock under the full sun or in chinks of old walls. It is a sweetly graceful and cheery plant, whose soft pink flowers, repeated by hundreds at a time upon one clump, fill the air around with a delicate and highly pleasing fragrance. We have a white and also a bright carmine variety. The Pyrenean cousin, *E. hirsutus*, distinguished by downy hairs from the glabrous *alpinus*, has been planted and acclimatised in Swiss alpine gardens. Both forms or varieties are excellent for giving a touch of life to rocks, walls, or banks in alpine gardens. The introduction of them cannot be recommended too highly; just a few seeds

scattered among the chinks or on mossy rocks is sufficient. On level *soil* they may die out.

The two following genera are of no real garden interest there insect and are, therefore, only described botanically to enable tourists to identify them.

Bartsia

*B. alpina** (Pl. LXXXVII), Bartsie, Alpenhelm. A sombre looking plant with erect stems, six or eight in., woolly, much leaved, especially toward the tips, where the leaves pass into dark-violet bracts; flowers small, blackish-violet, in erect raceme. Cool, shady places in the Alps and Jura, where it spreads into veritable colonies.

Pedicularis

Eng.: Lousewort; *Fr.*: Pédiculaire; *Ger.*: Läusekraut.

Partly parasitic; stems simple; leaves finely divided; flowers in spikes; calyx tubular, 3-5-toothed; corolla tubular, bilabiate, the upper lip projecting in the form of a beak; stamens four. Varieties:

P. tuberosa (Pl. LXXVIII). Stem 8-16 in., erect; leaves slender, bi-pinnate into oblong, toothed pinnules; flowers yellow, shaded brown, in erect spike. Alps; 1300-2200 m.; dry pastures.

P. foliosa a species sometimes reaching 20 in.; stem stout, erect; leaves large, deeply pinnatisect into narrow leaflets; flowers greenish-yellow, in coarse, compact spike. June-July; cool and grassy pastures of the Alps and southern Jura.

P. verticillata (Pl. LXXXVIII). A small plant with pinnatisect leaves, a little like those of *Asplenium Halleri*,

in whorl or collerette round the stem; flowers violet-carmine, spotted purple, in compact spike. Cool pastures of the main chain.

P. rostrata differs from the above in a small habit, leaves not opposite, flowers larger, with crooked beak of bright flesh-pink, the rest of the corolla being vivid purple, in short, few-flowered, racemes. High Alps; 1500-2200 m.



Lentibulariæ, etc.



Our survey of the great kingdom of the Exogens is, so far as concerns the alpine garden or even the collector of alpine wild flowers, coming fast to a close. There remains but one genus of supreme merit, the *Daphne* or Garland Flower, one of curious interest, *Pinguicula* or Butterwort, and two perhaps of some garden value, *Globularia* and *Polygonum*. The rest of the remaining orders, if represented in alpine flora, is little more than a wilderness of weeds, given over to the Dock and the Nettle, or the temple of noble forest trees, chief of which upon the high hills is the gallant and sturdy pine. For the latter we refer readers to our work *Nos Arbres*. The wilderness one may well hasten over, glancing at the following.

Pinguicula

Eng. : Butterwort ; *Fr.* : Grassette ; *Ger.* : Fettkraut.

A member of the Lentibulariæ with the characteristics of that order :— leaves radical, rosulate, glandular-viscous ; flowers solitary, irregular ; calyx two-lipped or five partite ; corolla monopetalous, irregular, the lower lip spurred ; two stamens ; one very short style. It is the most carnivorous of Swiss plants, being furnished with glands visible to the naked eye, the leaves serving as veritable traps for insects. The viscid secretion acts as a bait to tiny, thirsty flies, which are caught in it, killed, torn to pieces and finally absorbed into the leaf. The

greater the heat, the greater the number of insects captured.

Cultivation is not easy. It is especially important to remember that after the seed ripens, the leaves wither and disappear, leaving nothing but a globular bud which may be blown about by the wind or washed away by rain. This bud is a sort of aerial bulb or pseudo-bulb and care must be taken to bury it in the ground, in order to preserve it through the winter. Needless to say, the situation must be very moist.

In Lapland the leaves are used to curdle the milk of the reindeer, which is poured fresh-drawn over them through a cullender. After filtration, the milk is allowed to stand for two days till it turns. The result is a thick curd, firmer than that of milk treated in the ordinary manner; the whey remains and the taste is more pleasant, despite of a deficiency in cream. It has properties similar to those of yeast, one or two spoonfuls serving to curdle fresh milk and so on indefinitely. The process is like that used by the Bedouins beyond the Jordan in making their *leben*.

P. vulgaris * (Pl. LXXXIX). Viscid, with fleshy, glossy, succulent leaves, marginally incurved, in broad rosette close to the ground; leaves violet-blue. June-July. Bogs.

P. grandiflora * differs in a large corolla with spreading oval lobes, as broad as long, and a broader, thicker spur. Very high places, especially in chalk. Increased by basal bulblets.

P. Reuteri. Flowers large, beautiful pink with purple spots and a bright pink spur. Commonest in the Jura.

P. alpina * (Pl. LXXXIX). Leaves much incurved on the margins, only slightly viscous, yellowish green, occasionally brownish on the circumference; corolla

smaller, creamy white, with two yellow spots on the lip. Alps; 800-2200 m. July-August. Peaty soil with rough gravel.

Globularia

The type of the order Globulariæ. An essentially alpine genus of pretty plants with persistent leaves, lilac-violet or bluish flowers, globular or conical in shape, which all grow on dry, sunny mountain slopes, especially on chalk formations.

G. cordifolia is a familiar dwarf plant, which spreads like a carpet over earth or rock, with spreading, prostrate, branched shoots, bearing many small leaves, spatulate or cordate, emarginate at the tip, in rosettes from which the scapes rise; flowers bluish lilac, in small cones or compact, flattened balls. May-July; 800-2000 m. Mountain slopes. There is good variety with white flowers.

G. vulgaris. Leaves large, dark green, glossy, ovate, blunted, slightly emarginate, in a large rosette; from the centre of the rosette spring the floral scapes, which are leafless, erect, stiff, 4-12 in.; flowers violet, in terminal, globular umbels. May-September. Warm, dry hillsides in the chalk. Sometimes it is found with white flowers.

G. nudicaulis. Leaves oblong, very smooth, dark, glossy green, in sturdy, cæspitose tufts. Stem 6-12 in., often violet or blackish; flowers many, violet-blue, in coarse, terminal ball. June-July. Grass slopes of the limestone Alps; 1000-2000 m.

Another excellent kind, perhaps the best of all, is the Pyrenæan *G. nana* with thyme-like leaves and charming blue flowers.

All the species are excellent and ornamental plants for the rockery, for dry banks in the wild garden. For decorative effect and to lovers of quaint beauty they have

much to recommend them—a long period of bloom, astonishing hardiness or, as one might say, indestructibility, charming flowers, whose agreeable shade goes well with any general colour-scheme. To ensure vigorous growth and prolonged florescence, nothing is needed but a stony soil and an open, sunny position; *nudicaulis*, however, requires the soil to be dense and rich in humus.

Of the Polygonææ, to which belong several valuable sources of food-stuffs, such as buckwheat, sorrel, rhubarb, or medicinal herbs, as bistort and dock, one may mention two, *Rumex* and *Polygonum*.

Rumex

Eng. : Dock ; Fr. : Oseille ; Ger. : Sauerampfer.

This genus contains two striking varieties :—

R. scutatus (Pl. XC). Common on rock-falls ; in itself of no importance but often welcome to a thirsty tourist, who has found relief in the acidity of the leaves. Stems slender, branched ; leaves glaucous, with large basal lobes ; flowers greenish, unattractive.

*R. alpinus** (Rhubarbe des Moines, Lappis or Lappé). A plant with coarse, dark green, reddish foliage ; stems erect ; flowers green and reddish. Abundant round alpine chalets, where it forms literally solid fields, leaving no room for other plants. Valued as a depurative and purgative ; recommended by many for cancer.

Polygonum

Eng. : Knotweed ; Fr. : Renouée ; Ger. : Knoterich.

Among the host of the Polygonums which are a world-wide family of over a hundred and fifty species, mostly

insignificant weeds, several are useful garden plants, some dwarf and charming such as *P. affine*, of deep green leaves and rosy crimson flowers, the rosy-pink *P. vaccinifolium* and *P. sphærostachyum*, all Himalayan in origin, some are veritable giants, as the famous rampant climber from Bokhara, *P. baldschuanicum*, or the noble Japanese bog plants, *P. cuspidatum* and *sachalinense*. From the Alps comes

*P. Bistorta** (Pl. XC). Bistort, Snake-root. The flower is the neat raceme of bright pink, or sometimes of carmine, which brightens the cool grasslands of the Alps and Jura, in the alpine zone. The thick, tuberous rootstock is twice twisted into the shape of an S, and has a very strong and acridly astringent taste. Used as an astringent.

But the one true jewel hereabouts, a diminutive, wee little shrub with fragrant coloured flowers and funnel-shaped perianth, comes from the shrubby or subshrubby Order of Thymelææ. The members of this Order are distinguished by their fibrous and very tenacious bark; by alternate, exstipulate leaves; a calyx of coloured, rarely green, sepals, with four equal lobes; the eight stamens are set in two ranks on very short filaments; there is a solitary style. The bark, leaves and fruit, when fleshy, contain exceedingly acrid, vesicant juices.

Daphne

Eng.: Spurge Laurel; Fr.: Daphné; Ger.: Seidelpast.

D. Cneorum (Pl. XCI): Thymelée des Alpes, Steinröschen. A sub-shrub forming a trailing evergreen cushion, with prostrate, much divided branches, naked below, leaved above; flowers of beautiful, vivid rose, very fragrant, the exterior of the corolla-tube downy.

May-June. Certain parts of the Jura and Ticino Alps.
Often flowers twice a year.

Là-haut, près du ciel, au sein de l'alpage,
Dans les blancs rochers du Jura vaudois,
Le doux Thymélée à la fleur en croix
Parfume et bénit tout le voisinage.

Tout le long du mont, sur l'agreste crête,
La fleur incarnat chante nuit et jour
Sous le gai soleil sa chanson d'amour,
Une mélodie austère et discrète.

Là-haut, loin du bruit, loin des cris du monde,
Il s'étale heureux, sous un ciel bien clair,
Et sa fleur suave aux couleurs de chair
Jette son encens partout comme une onde.

D. striata, from the Grisons Alps, differs in erect branches, narrower and longer leaves, and hairless flowers in more crowded heads.

D. alpina (Pl. XCI), from sunny rocks of the calcareous Alps and the Salève, is a small, erect, deciduous shrub, the branches divided, thick, wrinkled, nodose, leaved at the top, 20-25 in.; leaves small, ovate-lanceolate, glaucous-green, with silky hairs; flowers white, silky, outside, in terminal umbels. May-June.

*D. Mezereum** (Bois-Gentil or Garou) is a small, familiar shrub, Stems thick, erect, with very fragrant, rosy-violet, sessile flowers at their extremities. Deciduous, flowering before the leaves are put forth.

*D. Laureola**, Spurge Laurel, differs in its persistent, laurel-like leaves, greenish-yellow flowers in compact, axillary cymes. Both these last flower in the earliest days of spring.

All varieties do best when shaded from the mid-day sun; *D. Laureola*, in fact, is quite happy under trees.

They require shelter from winter winds and liberal dressings of leaf mould; peat and sand should be added to heavy soil. *Mezereum* and *alpina*, at least, come readily from seed, but *striata*, *Cneorum* and the rare little Tyrolean *rupestris* are very difficult to increase in this way and are perhaps best grown when grafted on some commoner, sturdier kind as *Laureola* or by cuttings, as we do freely at Floraire.

Unfortunately the better and choicer the variety, the more capricious does it show itself under cultivation, nor can it be said that the correct method of treatment has yet been discovered; if they succeed, they do, and seem fairly indifferent as to soil; if not—they quickly give up the attempt. No collection is complete without the Carniolic *D. Blagayana*, an exquisite prostrate species; and, as might be expected from the native land of exquisite flowering shrubs, Japan sends two of the very best, *D. Genkwa* and *D. odora*, the latter, however, of doubtful hardiness.



Endogens and Acrogens



Writers of descriptive works on gardening have so often confined their survey of flora wealth to the kingdom of Exogens, that custom has almost sanctioned the usage of relegating the kingdoms above mentioned to separate volumes. Of course it is very wrong; they were weary of well doing — *errare humanum est*. I myself, for example, have treated the important and glorious family of Orchids in two large volumes, and our Hardy Ferns in a third, to which I must refer for details any who may be interested in these subjects. Swiss mountains, both Jura and Alps, possess rich collections stamped with the picturesque charm which is so characteristic of both orders. Yet to give a rounded completeness to the present work I have included a few of the most typical Swiss alpines from the various orders of the Endogens and from the Ferns, promising that, if the welcome accorded by the public encourages me to a full revision at some future time, all omissions shall be made good to the best of my powers.

Orchis

Everyone must have been struck by the sombre, yet rich colouring of *Nigritella angustifolia* (*Orchis nigra*) (Pl. XCII), called in French “Orchis vanille”, and in German “Schwarzstendel” or “Mannertreue”, on account of the strong vanilla scent of the pyramidal flowers,

whose tufts of velvety brown seem like so many garnets or rubies set among the emeralds of the alpine fields. July-August. All alpine districts, including the Jura.

Orchis globosa (Pl. XCII) grows in grassy parts of the alpine zone, and throws short, crowded spikes of rosy-lilac flowers in the shape of a rounded cone. June-July. Alps and higher Jura; 1200-2000 m. Lastly *Gymnadenia albida* (Pl. XCII), with a small spike of clear yellow, honey-scented flowers, may be found among the Rhododendrons or banks of Heaths and Whortleberries, in the Alps and Jura.

Lilium

Eng. : Lily; Fr. : Lis; Ger. : Lilie.

L. Martagon (Pl. XCIII), Turk's-cap Lily. One of the noblest sights in the Swiss hills during July-September. Stems strong, sometimes reaching 40 in.; leaves in whorled tiers; flowers beautiful, large, drooping; corolla reddish, or the colour of wine-lees, with brown spots, the divisions recurved like a turban; scent penetrating—all unite to invest it with charm. Three times I have found pure white examples, and always in the neighbourhood of Bourg-St-Pierre, a district which must have something making it peculiarly favourable to the production of albinos. In English and Irish gardens the white form is common and much sought after.

The culture is easy; nothing is wanted but shade, partial or complete, and a light, deep, cool, decomposed soil. At Floraire it is found to develop magnificently in the lowlying part of the garden, while it is much less successful in the heavy, gravelly soil above. One must wait some years before the true character is shown.

Other mountain species in cultivation are; *L. pyrenaicum*

with yellow flowers and bright red anthers; this is a perfect gem, and should not be omitted in any shrubbery; there are also varieties with flowers of cardinal, vermilion and cinnabar red : *L. carniolicum*, *chalconicum* and *pomponium rubrum*, all which do well in any light and deep soil, if a little shade can be given to them. The above named lilies belong to the Turk's-cap group, and are beautiful, decorative plants, deserving a place in every garden, as a kindly, shaded corner can always be found under trees and rough undergrowth; the most meritorious, *Martagon* and *pyrenaicum*, do not require the least attention.

Paradisia Liliastrum

Eng. : St.-Bruno's Lily; Fr. : Paradisic, Lis de St.-Bruno;

Ger. : Trichterlilie.

This (Pl. XCIV) is a truly (or rather as falsely) the Lily of the Alps as the Rhododendron is the Rose, a lily pure and spotless, intoxicatingly sweet, with beautiful and large white corolla, six golden stamens, inflorescence racemose, proudly set in the heart of the grassy slopes it loves and where it flowers in July. Native of the Alps and Jura; 1200-2000 m. Easily grown in any lightish soil and sunny position. For some years we have had at Floraire a magnificent variety with immense flowers not falling far short of the white Madonna Lily.

Anthericum Liliago (*Paradisia Liliago*; St. Bernard's Lily) (Pl. XCIV) differs from the above in taller, branching stems, and smaller flowers. Grows in lower districts, on warm and rocky slopes of the mountain zone. Lastly, on dry and sunny limestone banks of all the lower hills, one finds *A. racemosum*, known in French Switzerland as "Lis des Rochers", and at Fribourg as "l'Herbe

à l'araignée". This is a diminutive form of the two species already mentioned; habit tufted; stems slender, hard, filiform, branched, almost leafless; flowers small, white; anthers saffron; panicle large and branched. June-August. Very ornamental for rocks and dry banks of gardens.

Lloydia

L. serotina. A small, lowly, winsome plant; stems thin and slender, rising from a very delicate tuft of linear leaves, as fine as grass; flower solitary, 5-cleft, white with pink or yellow spots on the interior. Cool, shady slopes of the High-alps; 1800-2600 m.

Veratrum

Eng. : False Hellebore ; Fr. : Véraire, Véraire, Hellébore blanc ;
Ger. : Germer.

V. album (Pl. XCV). A stiff and stalwart plant belonging to the Colchicaceæ found in all mountain pastures where it remains undisturbed by the cattle which refuse to touch it. It resembles the yellow Gentian except for the alternate, deeply plicate leaves, the greenish tinge of the flowers, which are 6-fid, in numerous spikes forming a compact panicle. July-September; pastures.

V. Lobelianum differs in that the flowers are green within as well as without. In *V. nigrum* the flowers are smaller, more numerous, and blackbrown. July-August; woody slopes and glades of the French Alps, eastern Switzerland and Tyrol.

The Veratrum are most poisonous; the root contains Veratrine, a very energetic and toxical emetic. It is used for scabies and other skin affections and also for

inflammatory fevers. As decorative plants they have their value; planted singly or in isolated groups they produce a magnificent effect, especially *V. nigrum*, whose flowers have a distinctive and piquant flavour all their own.

Luzula

Eng.: Woodrush; *Fr.*: Luzule; *Ger.*: Hainsimse.

This plant has the grasslike appearance and narrow, filiform or sheathed leaves characteristic of the order Juncaceæ. The flowers are small, regular and bracteate, with a somewhat membranous perianth and six stamens. It is a native of woods or, occasionally, of high alpine pastures.

L. nivea (Pl. XCVI). Obliquely rooting plant; leaves grass-like; flowers snow-white, with acute divisions, the exterior one third shorter than the interior, in corymbose cymes. Woods of mountain districts; local. In *L. albida* the rootstock is horizontal; perianth reddish at maturity, the divisions ovate-lanceolate, the exterior a little shorter than the interior; flowers in a very lax cyme.

The two plants are closely related; both do well in garden shrubberies or on the edges of clumps of trees.

L. lutea (Pl. XCVI). High pastures of the granitic Alps; occasionally on the transitional formations; 2000-2500 m.

Eriophorum

Eng.: Cotton-Grass; *Fr.*: Linaigrette; *Ger.*: Wollgras.

Bog plants, to the seeds of which are attached bristles, generally of glistening white and forming a feathery tuft

which varies in size according to the species. They are members of the Cyperaceæ.

E. Scheuchzeri (*E. capitatum*) (Pl. XCVII). Rootstock slender, spreading; stems cylindrical, 4-8 in.; heads solitary, ovoid-globose. Alpine bogs. *E. vaginatum* differs from it in a tufted, fibrous rootstock; stems trigonous, 12-16 in.; leaves many, stiff, narrow, trigonous; spikelet ovoid. Peat bogs of the Alps and Jura.

E. angustifolium (Pl. XCVII). Rootstock short, thick; stem up to 20 in., almost cylindrical; leaves flat but trigonous above the middle; heads 2-6, drooping after florescence, in umbellate cyme. All Swiss marshes. In *E. latifolium* the tufts are smaller, the bristles shorter, the stem practically trigonous, with scaberulous and often branching peduncles (smooth and simple in *angustifolium*).

E. alpinum. A minute species only found in peaty regions of the alpine zone (Alps and Jura). Forms broad, compact tufts; stems 6 in., trigonous; spikelets very small, almost miniatures; perianth-bristles wavy and scanty.

Carex, etc.

The genus of the Sedges also belong to the Order Cyperaceæ. Nearly a thousand species are known, and Switzerland possesses close upon one hundred. They abound in all our mountains and wooded districts, spreading their stiff, dry vegetation over waste and marshy moors.

Filices

A sense of mystery and awe broods over this most ancient, strange and distinctive among the families of the

vegetable world, this primeval and wondrous race of Ferns, which reigned over the earth during the carboniferous period in forests of gigantic trees measuring, may be, thirty feet in girth of trunk and well outtopping the highest of our time. Some hundred and sixty families, of more than nine hundred species, which then flourished, are known to us by the prints they have left and which have been preserved till to-day in the deposits of various kinds of coal. Yet palæontology is far from knowing all and the carboniferous beds have not given up all their secrets.

The Ferns of our own period are fallen far from their ancient estate and, in the northern hemisphere at least, are lowly denizens of secrecy and shade. But humble and modest though these daughters of the woods and rocks be, no plant is more gracious or ornamental in garden, rockery or room. The delicacy and beauty of the fronds is altogether charming in its airy freshness, and one does not notice the absence of a flower. In two volumes I have described the strange method of fecundation and reproduction peculiar to these flowerless plants, whose sexual organs are fixed behind a green plate which appears first after the germination of the spores and is known by the name *prothallium*. One of these publications was very rapidly sold out and quickened many amateurs to give a large and kindly place in their gardens to these winsome children of the woods. Cultivation is easy; it is enough, so far as concerns the majority of our native species, to provide a good bed of decomposed leaf-soil and a little atmospheric moisture such as is secured by a cool and shady situation. Nothing is more suitable than the ground at the foot of deciduous trees.

*Botrychium Lunaria** (Pl. XCVIII) : Moonwort. A little plant that grows among the alpine turf, each rhizome

pushing up a single axis or stem, which carries two fronds or leaves, one sterile and expanded half way up, one fertile and forming an erect and composite raceme of clustered sporangia (little yellowish granules) in which the spores or reproductive organs are hidden. May-June. The name, from the Greek for a cluster of grapes, is most happy.

*Cryptogramma crispa**, formerly *Allosurus crispus* (Pl. XCVIII), or Curled Rock-brake, is another true alpine from granitic rocks of over 2000 m. The tufts sometimes grow to considerable size and the effect of the clear green foliage is altogether charming. The popular name, Parsley Fern, is most descriptive of the fronds, which take two forms; the sterile with oval, flat segments, bipinnate with bi-tripinnate pinnules (to the right in the illustration); the fertile with oblong, thick segments, as a rule tripinnate below, bipinnate above.

Cystopteris or Bladder Fern also is a mountaineer of utmost grace. *C. fragilis** (Pl. XCIX) has elegant, airy fronds, of 10-20 in., extremely brittle, and oblong in main outline, on a dark green, brownish axis, with ovate-lanceolate, needle-pointed segments and pinnatifid leaflets. No wall or rock fern is more charming or welcome to similar spots in our gardens, where as a general rule it does well. *C. alpina**, from calcareous rocks, is distinguished by more closely bunched fronds, ovate in outline with crowded, deeply cut leaflets, terminating in a few teeth instead of a point. The rarest and most delicate of all is *C. montana** from pure chalk. Outline triangular, almost as broad as long, on long, bright green axis. No native fern is so finely divided and fretted. Tripinnate.

*Woodsia hyperborea**, a delicious little fern, found here and there among the granitic Alps and nowhere abundant.

It recalls *Cystopteris fragilis* but the fronds are shorter and smaller, 2-9 in. at most, dead green, with broad almost entire lobes, bearing green hairs. On fructification the underside of the edges is magnificently embroidered by a pattern of brown points.

Blechnum spicant : Hard-fern (Pl. XCIX), spreads in chance spots among wooded and hilly places its tufts, which at times attain large dimensions. The numerous horizontal sterile fronds are furnished with many broad, entire, close-set segments of shining dark green; the fertile are erect, narrow, elongate, with thick, narrow, wide-set segments. Both are smooth. The spore-cases are arranged in a long, narrow, continuous line on each side of the mid-rib.

*Aspidium Lonchitis** : Shield or Holly Fern : haunts the upper woodlands, the "lappiaz", and rocks of the alpine zone as far, sometimes, as 2500 m. It forms a pretty tuft of dark verdure, with stiff, erect leaves, enduring through winter. The divisions are close-set, ovate-lanceolate, notched, sickle-shaped with an ear-like lobe at the base.

*Aspidium lobatum** differs by large, fine, glossy green fronds, leathery in texture. So much, unhappily, is the species in request for winter decoration that it is yearly becoming rarer in the hills. The outline of the frond is lanceolate; the leaflets rigid, spinosely toothed, almost actually spinose, sickle-shaped with basal ear-lobe. They decrease in size with the distance from the rhizome. This is the best fern for cultivation.

The *Aspidiums* are also known under the name *Polystichum*.

Polypodium or Polypody supplies three saxatile species : *P. Robertianum** (*P. calcareum*), (Pl. C) with frond of broadly triangular outline, minutely glandular below; a

native of woods and rocky debris in all Swiss mountains, especially in the calcareous ones; *P. Dryopteris*, the Oak-fern, which differs by a more slender and more rampant rhizome, by shorter, blunter, glabrous fronds, whose segments are always opposite; a native of woods in the alpine and sub-alpine zones; lastly *P. Phegopteris* or Beech-fern with toothed and hairy leaflets, the lowest pair bent backward. The main outline is an elongated triangle. It differs also from the two above in that the frond is pinnately divided and not in the least ternate. From cool places in the granitic Alps and odd woods in the Jura.



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